

Assiut University
Faculty of Science
Chemistry Department



Final Examination for Organic Master Students (Second Term)

(Polymer Chemistry and Macromolecules)

Date: Thursday 27/06/2024

(Code : C 695)

Time: 2 hours

Answer Five Only from the following questions :

(10 Mark for each one)

- 1) Write on the types of moulds, types of spinning, and the mechanical properties of polymers ?
- 2) Explain the types of composites, and its applications ?
- 3) Discuss what you mean by the crystallinity in polymers?
- 4) Write on the types of Fillers, its properties and applications.
- 5) What you mean by Adhesives, its types, and properties?

Examiner:

Prof. Dr. Kamal Ibrahim Aly



Final Exam for MSc Students

June 2024

Advanced Geochemistry of sedimentary rocks (G 644)

Time allowed: 3 hours

(50 marks)

Answer only four (4) from the following: (12.5 marks for each question)

1- Explain how you can use the variation in the following approaches to deduce the *source rock composition* of shale and /or sandstone

A- Index of Compositional Variability (ICV)

(ICV= $\text{Fe}_2\text{O}_3 + \text{K}_2\text{O} + \text{Na}_2\text{O} + \text{CaO} + \text{MgO} + \text{TiO}_2 / \text{Al}_2\text{O}_3$)

B- $\text{K}_2\text{O}/\text{Al}_2\text{O}_3$ ratio

C- La/Sc and Th/U ratios

2- A- Discuss the mechanisms for minor elements enrichment with Organic Matter in the black shales.

B- Discuss briefly: Sharp and gradual decreasing of $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ in sedimentary records (find possible explanations)?

3- The marine phosphorites, as a class, are characteristically enriched, relative to shales, in a large group of trace elements. Explain the fixation of these elements in the different phases of phosphorites.

4- Use geochemical multiproxy approaches (elements and elemental ratios) to Explain how you can evaluate the possible causes responsible for the following geologic events:

A- Detrital input

B- Nutrient and Productivity input

C- Hydrothermal and volcanic inputs.

5- Discuss briefly:

A- -Discuss and identify the various redox conditions (environments) in the early diagenesis. Illustrate your answer via the sequence of chemical equations using organic matter with a Redfield stoichiometry $(\text{CH}_2\text{O})_{106}(\text{NH}_3)_{16}\text{H}_3\text{PO}_4$.

B- Preparation of solid samples for the geochemical analysis.

مع أطيب التمنيات بالتوفيق
أ.د/ ممدوح فراج سليمان

Assiut University
Faculty of Science
Geology Department



June. 2024
Time: 3 hours
Total 50 Marks

Postgraduate exam (M.SC) in inverse Theory (G606)

Answer the following questions:-(50 marks 12.5 marks each)

- 1-what does mean by direct and inverse theory in geophysics?. Give an example for application in case of 2D earth resistivity modeling.
- 2-If you have a body in the shape of sphere, buried at depth (h) from the ground surface and have mass (M) with density (σ). Mention the direct and inverse solutions of the gravitational field over this body and draw the corresponding curves by applying proposed parameters from yourself.
- 3-Calculate the depth to the upthrow (Z_1) and downthrown blocks (Z_2) as well as the vertical throw (H) of vertical fault by applying the inverse solution for the maximum horizontal gradient of the gravitational field above this fault.
- 4-calculate the vertical depth (Z_1) to the top of cylinder and its other parameters by Solving the reverse solution of the gravitational field above this cylinder considering $Z_2=0$.

===== Best wishes =====

Prof. M. Sensoy

Answer Only Five from the following questions: (50 Marks)

- (1) (a) What is the condition on frequency calculations for chemical molecules? What is the information we can get from frequency calculations?
(b) What are the advantages of Slater determinant over Hartree products?
(10 Marks)
 - (2) How many total basis functions and total primitives for CH₄ using 3-21G basis set?
(10 Marks)
 - (3) What are the properties can be calculated using computational chemistry?
(10 Marks)
 - (4) What are the Hückel theory postulates? Derive the energies and coefficients using Hückel theory for ethylene molecule.
(10 Marks)
 - (5) Write the general equation for molecular mechanics calculations.
What is the difficult part in these calculations and how we can overcome it?
What are the characteristics of these methods?
State two examples for molecular mechanics methods and their advantages and disadvantages.
(10 Marks)
 - (6) Write the total Hamiltonian without and with atomic units for each of the following: H₂⁺, H₂ and He.
What is the difficult part in calculation in the Hamiltonians of H₂ and He molecules and why?
(10 Marks)
-

Good Luck
Prof. Dr. AbdelRahman A. Dahy

5. Choose the correct answer for the following: (16 Marks)

- a) How many oxygen atoms lined up in a row would fit in a one nanometer space?
1) None. 2) one. 3) seven. 4) seventy.
- b) Which of the following is an example of top-down approach for nanomaterials synthesis?
1) Gas-Phase agglomeration. 2) Molecular self-assembly.
3) mechanical grinding. 4) optical beam epitaxy.
- c) Which of the following is an example of bottom-up approach for nanomaterials synthesis?
1) Etching. 2) Dip pen nanolithography.
3) Lithography. 4) Erosion.
- d) The properties like melting point, solubility, color, ...etc, changes on varying...
1) Size. 2) surface properties.
3) composition. 4) none of the mentioned
- e) The properties like dispersibility and conductivity changes on varying
1) Size. 2) Surface properties.
3) Composition. 4) None of the mentioned
- f) Fabrics are extensively made from nanomaterials like ...
1) Carbon nanotubes. 2) fullerenes. 3) mega tubes. 4) polymers.
- g) What is the general name for the class of structures made of rolled up carbon lattices?
1) Nanorods. 2) Nanotubes. 3) Nanosheets. 3) Fullerenes.
- h) What is the measurement tool needed to measure the length of DNA?
1) Ruler. 2) Electron Microscope. 3) Optical microscope.

With my best wishes

Associate Professor. Haitham El-Bery

Assiut University
Faculty of Science
Chemistry Department



Date: 27/06/ 2024

Time: 2 hours

Marks: 50

**Nanomaterials Chemistry Examination (C-606)
For Science Postgraduate Master (M.Sc.) students**

Answer the following questions: (50 Marks)

1. Define only two of the following terms (4 Marks)

Nanotechnology; nanoplasmonics; quantum dots

2. Differentiate between only three of the following (15 Marks)

- a) Zero, one, two- and three-dimensional nanomaterials.
- b) SEM and TEM as characterization tools for nanomaterials.
- c) XRD and XPS techniques.
- d) Top-down and bottom-up technique for nanomaterials synthesis.

3. Discuss only one of the following statements: (5 Marks)

- a) The role of the inert gas in the sputtering process.
- b) LASER ablation technique for nanomaterials production.

4. Put (✓) or (X) for the following sentences, and correct the wrong answer: (10 Marks)

- a) Buckyball are concrete nanoparticles with compressive strength of 20 nm.
- b) Aluminum at the nanoscale is highly combustible
- c) Quantum confinement causes the energy gap of semiconductor is proportional to the inverse of the size.
- d) Self-assembly is a top-down manufacturing technique.
- e) Self-assembling molecules adopt an organized structure which is thermodynamically more stable.
- f) Nanomaterials are used in the light emitted electro-luminescence devices.

10- 6 nucleosomes are packing together to form

- a. Chromatid b. Chromosome c. Solenoid d. DNA

11- In which carbon do the deoxyribonucleotides lack an -OH molecule?

- a. C1 b. C2 c. C3 d. C4

12- Which of the following is known to relax supercoiled DNA?

- a. Endonuclease b. Helicase c. Ligase d. Topoisomerase

13- In prokaryotes, during replication, the RNA primer is removed by

- a. RNA polymerase b. DNA polymerase c. DNA polymerase III d. DNA polymerase β

14- Semiconservative replication means that the parental DNA strands serve as templates for the synthesis of the new progeny DNA strands. a-true b-false

15- A 5-to-3 synthesis of DNA means that growth occurs by addition of dNTPs to the exposed 3-OH group.

a-true b-false

16- Single-strand binding proteins at the replication fork hold the two strands of a DNA apart by covering the bases and thus preventing base pairing. a-true b-false

17- Purines and pyrimidines form glycosidic linkage with the pentose sugar at the N1 position. True b. False

18- It is easy to break the bond between A and T than in between G and C. a. True b. False

19- Polymerization of dNTP by DNA polymerase is in 3' $\rightarrow$ 5' direction. a. True b. False

20- DNA always carries the genetic information for all organisms. a. True b. False

Q2: Give (in table) the differences between Three only of the following: (15 marks)

1. Promoter structure in Eukaryotes and Prokaryotes
2. Gene structure in Eukaryotes and Prokaryotes
3. Ribosomes in Eukaryotes and Prokaryotes
4. DNA polymerase III and RNA polymerase II

Q3: Write on TWO only the following: (15 marks)

- a- siRNA mechanism
- b- Translation initiation complex
- c- Rolling circle replication

Best Wishes Prof. N. Yousef



Answer the following: [Total 50 marks]

Q1: Choose the correct answer (20 marks)

1- After DNA replication is completed,

- A- each new DNA double helix consists of one old and one new DNA strand
- B- each new DNA double helix consists of two new strands
- C- one DNA double helix consists of two old strands and one DNA double helix consists of two new strands
- D- each of the four DNA strands consists of some old strand parts and some new strand parts

2- DNA and RNA are different because

- A- DNA has Uracil while RNA has Thymine
- B- DNA is double stranded while RNA is triple stranded
- C- DNA is only found in the nucleus while RNA can travel anywhere in the cell
- D- DNA is made of four bases while RNA is made of five bases

3-- DNA which is wrapped around 4 pairs of histonic protein is termed

- A- nucleosome
- B- leucine
- C- nucleotide
- D- methionine

4-The bases Adenine and Thymine are paired with

- a- Double hydrogen bonds
- b- Single hydrogen bonds
- c- Triple hydrogen bonds
- d- Both b- c

5- DnaA protein has an important role in initiation of

- A- DNA replication
- B- transcription
- C- translation
- D- all of the mentioned

6-Which of the following statements about DNA replication is TRUE?

- a. the leading strand is replicated continuously, while the lagging strand is replicated discontinuously
- b. the leading strand is replicated discontinuously, while the lagging strand is replicated continuously
- c. both the leading and lagging strands are replicated continuously
- d. both the leading and lagging strands are replicated discontinuously

7- How many origin of replication are present in the *E. coli* genome

- a. 1
- b. 100
- c. 1000
- d. Uncountable

8- Which of the following is a component of the nucleic acid backbone?

- a. Nitrogenous base
- b. Pentose sugar
- c. Amino acid
- d. Hydrogen base

9- The unlinking of DNA is promoted by

- a. Helicase
- b. Polymerase
- c. Topoisomerase
- d. Primase

3-a) Use the general LaGrange multiplier method to derive the necessary and the sufficient conditions for $\underline{x}^*$ to be a local minimum of the

problem $\text{Min } f(\underline{x})$, $\underline{x} \in R^n$

$$\text{S.t } C_i(\underline{x}) = 0, i = 1, 2, \dots, m$$

b) Use the LaGrange multiplier method to solve

$$\text{Min } f(\underline{x}) = x_1^2 + x_2^2 - 3x_1x_2$$

$$\text{S.t } c(\underline{x}) = x_1^2 + x_2^2 = 8$$

4-a) Derive the necessary and the sufficient conditions for the given

problem $\text{Min } f(\underline{x})$, $\underline{x} \in R^n$, where $f(\underline{x})$ is a continuous and differentiable function for all needed order

-b) Find the extreme points of the function

$$f(x) = 3x^4 - 20x^3 + 36x^2 + 16$$

5-a) Prove that the gradient vector g of a function $f(\underline{x})$ at $\underline{x}^*$

$(\underline{x}, \underline{x}^* \in R^n)$ is orthogonal to the tangent plane for the surface $f(\underline{x}) = \text{constant}$
 $\underline{x} \in R^n$



Answer four questions only from the following questions:

1-a) Derive the necessary and the sufficient conditions for the given problem $\text{Min } f(\underline{x})$, $\underline{x} \in R^n$, where $f(\underline{x})$ is a continuous and differentiable function for all needed order

-b) Find the extreme points of the function

$$f(\underline{x}) = x_1^3 + x_2^3 + 2x_1^2 + 4x_2^2 + 6$$

2-a) If all partial derivatives of the function $f(\underline{x})$, $\underline{x} \in R^n$ exist through order $r \geq 1$ and are continuous at $\underline{x}^*$, then define the r th differential of f at $\underline{x}^*$ and then find the second order Taylor's series approximation of the function

$$f(\underline{x}) = x_2^2 x_3 + x_1 e^{x_2} \quad \text{at } \underline{x}^* = (1, 0, -2)$$

3-a) Use the general LaGrange multiplier method to derive the necessary and the sufficient conditions for $\underline{x}^*$ to be a local minimum of the problem $\text{Min } f(\underline{x})$, $\underline{x} \in R^n$

$$\text{S. t } C_j(\underline{x}) = 0, \quad i = 1, 2, \dots, m$$

b) Use the LaGrange multiplier method to solve

$$\text{Min } f(\underline{x}) = x_1^2 + x_2^2 - 3x_1 x_2$$

$$\text{S. t } c(\underline{x}) = x_1^2 + x_2^2 = 8$$



Assiut University
Faculty of Science
Physics Department



Course Name: قياس الجرعات الإشعاعية Final Exam 2nd semester 2023/2024

Course code: (P660) Date: 4/07/2024 Program: Medical Physics Master Degree

Time Exam: 3 h Total Mark: 50 Mark Student Name:

Answer five questions only from the following.

1. Explain the operation of Gas-filled detectors? (10 Marks)
2. List the ionization chamber types and construction? (5 Marks)
3. Explain the principle of operation Geiger counter? (10 marks)
4. What are the types and applications of Geiger counter? (5 marks)
5. Explain the principle of operation Photomultiplier Tube (PMT)? (5 marks)
6. Explain (Film Badge)? (7.5 marks)
7. Explain (TLD)? (7.5 marks)

End Of Exam

With all my best wishes

Dr. Shehab Al Beltagy



Final Exam of Organic Stereochemistry (622C) for the Master Level students

Answer ALL of the following questions: (50 Marks)

1- Provide a brief description for SEVEN only of the following supported with examples?

(7×3 = 21 Marks)

- | | |
|-----------------------------------|-------------------------------|
| a) Stereoheterotopic ligands | b) Axis of symmetry (C_n) |
| c) Diastereomeric excess | d) Stereoselective reactions |
| e) Plane of symmetry (δ) | f) Metamerismis |
| g) Eclipsed conformation | h) Functional isomerism |
| i) <i>meso</i> compounds | |

2- Predict the product(s) for FIVE only of the following reactions and indicating their ratio and stereochemistry of the product(s)? (5×4 = 20 Marks)

- Replacement of each one of homomorphic hydrogens in 1-propene with a Cl atom.
- Reduction of 4-*t*-butylcyclohexanone by hydride addition on either faces of carbonyl group.
- Hydrogenation of acetphenone by sodiumborohydride (NaBH_4) in methanol.
- The *syn* addition of *meta* or *para*-chloroperbenzoic acid (*m* or *p*-CPBA) to *cis* & *trans*-2-butenes.
- Reduction of ethyl-3-oxobutanoate by Bakers yeast.
- Hydrolysis of Fumaric acid in presence of Fumarase (a chiral enzyme).

3- Answer ALL of the following with either (T) or (F)? (5 Marks)

(Final answers must be outlined in the answer sheet not here)

- In 2,4-dibromopentane, there will be always one enantiomeric pair of erythro and one enantiomeric pair of threo stereoisomer exists for a stereoisomers.
- Correlation between the D&L-designation and the sign of rotation is that, D form of isomer must be levorotatory, while L form of isomer will be dextrorotatory.
- A sample with 70% of one enantiomer and 30% of the other has an ee 40%.
- Atropisomerism is a phenomenon related to the restricted rotation about carbon-carbon single bond.
- Triple bonded molecules do not exhibit any kind of stereoisomerism because such molecule shows cylindrical symmetry.

4- If the observed rotation (*S*)-2-butanol is -4.05° , while the solution was made by diluting 6 g of 2-butanol to a total of 40 mL and the solution was placed into a 200-mm polarimeter tube, determine the specific rotation for this enantiomer? (4 Marks)

Good Luck

Prof. Dr./ Hassan Abdou Kotb

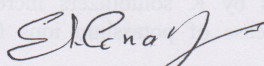
9	The inorganic forms of nitrogen absorbed by plants are usually nitrate and ammonium salts.	()
10	The process of N conversion formed by microorganisms is usually described as a cycle of three ordered reaction processes.	()
11	At high exogenous concentrations of soluble organic N, the uptake into the roots can occur by passive diffusion.	()
12	Plants can stimulate denitrification, via the release of organic compounds by rhizodeposition.	()
13	Some plants can inhibit denitrification by up to 80% through the release of procyanidins in root exudates.	()
14	Plant and microbial N demand can be high in low N soils, and if plants compete effectively with microbes for N, this can result in positive effects.	()
15	Mutualistic relationships between plants and mycorrhizal fungi can increase N_2O losses from soil.	()

Question no(3): Discuss five only of the following topics

(25 Mark)

1. Impact of phosphorus solubilizing microorganisms on the environment.
2. Soil phosphorous dynamics and rhizosphere interaction.
3. Role of microorganisms in potassium solubility and uptake.
4. Factors effects on the microbial potassium solubilization process.
5. Nitrogen cycle in the soil.
6. Non-symbiotic nitrogen fixation process by bacteria.
7. Soil organic matter decomposition by microorganisms.
8. Symbiotic nitrogen fixation.

WITH MY BEST WISHES



Prof. Abdel-wahab El-Enany

Assiut university Faculty of Science Botany & Microbiology department		
Selected topics in microbiology (B636)		
Academic program: M.Sc. (Microbiology)	2 nd Semester 2023-2024	Time allowed :2 hours

Answer the Following Questions

Question no (1): Identify each of the following terms (10 marks)

Siderophores – Immobilization – Aminisation – Rhizodeposits – Ammonification

Question no (2): Put true or false in front of each statement and correct the wrong answers (15 marks)

1	Some phosphate solubilizing microorganisms can create aminocyclopropane carboxylic acid deaminase, which increases the levels of ethylene in stressed plants.	()
2	Mycorrhizal fungi can increase the root surface, which helps the plant to utilize more nutrients.	()
3	The deficiency of phosphorus in plants increases the development of the main roots.	()
4	Microbial activity, soil buffering capacity, and plant genotypes all induced the rhizosphere pH variations.	()
5	In soils, total K is frequently present in higher amounts than other crucial elements like phosphorus or nitrogen.	()
6	The exchangeable ionic potassium is easily absorbed by the plant's root system and replaces the potassium on the exchange sites.	()
7	Phosphorus solubilizing microorganisms use polysaccharides secretion for the solubilization of phosphorus only.	()
8	Discharge of organic acids by K solubilizers increase the soil pH and ultimately result in the release of potassium ions from the minerals via protonation.	()

Look in the back

Assiut University
Faculty of Science
Geology Department

M.Sc. Exam in (G632)
موضوعات مختلفة متعلقة بعلم الطبقات وعلم الحفريات



June, 2024

Time : 3 hrs

Note: Illustrate your answer with appropriate diagrams

Explain shortly the role of well logging in Four Only of the following objects: (12½ mark for each)

1. Clay content, typing and distribution in reservoirs.
2. Prediction approaches of permeability of geologic reservoirs.
3. Porosity, saturation and geologic structures of clastic reservoirs.
4. Subsurface lithology quantifications using single and multi logs.
5. Facies analysis using total and spectral gamma ray logging methods.
6. Hydrocarbon source rock richness and maturation.

GOOD LUCK !!

Prof. Dr. Awad A. Omran



Tectonic Provinces of Egypt (G 648)

Answer only four questions (use drawing when possible).

1. Mention the main characters and origin of rifts?
2. Summarize briefly the different models of rifting at the crustal scale.
3. Write short notes only on four items of the followings:
 - A) Rollover anticline.
 - B) Hanging-wall syncline.
 - C) Rift-drift transition.
 - D) Passive and active margins.
 - E) Planar normal faults.
4. Elucidate the rock assemblages characterizing the upper tectonostratigraphic units (Pan-African napp complex) of the Hafafit province.
5. Try to cite the general geometrical structures and the different lithological composition of the core complex *of the Meatiq dome.*

With my best wishes
Prof. Dr. Ali A. Khudeir



Postgraduate exam (M.SC) in Selected topics related to the applied
geophysics (G 611)

Answer the following questions:- (50 marks 12.5 marks each)

- 1- What are the main evidences that contribute the relationship between the changes in the earth magnetic field and temperature?
- 2- Discuss the relation between the main components of the climate changes (temperature, carbon dioxide and sea level) all over the geologic history.
- 3- Increasing or decreasing in the intensity of geomagnetic field show a good relation with the concentration of the carbon dioxide. Discuss this relation through the time span 1980 and 2012.
- 4- Discuss in brief how can magnetic susceptibility measurements apply in determining the level of soil population.

===== Best wishes =====

Prof. Dr. M. Senosy

- (vi) For reaction of neutral molecules, there will be an overall decrease in volume if a(an) activated complex is formed.
 (A) polar (B) non polar
 (C) aqueous (D) charge-separated
- (vii) In the collision theory, if the reaction contains unlike charges:
 (A) The collision rate and the rate constant become smaller than the gas phase values.
 (B) The collision rate and the rate constant become greater than the gas phase values
 (C) The collision rate and the rate constant become equal to the gas phase values.
 (D) The collision rate becomes smaller than the gas phase value.
- (viii) For enthalpy of activation, in the dissociative mechanism at least bond is broken.
 (A) one (B) two (C) three (D) four
- (ix) Both shape and size of the activated complex are often dictated by the
 (A) solute (B) solvent
 (C) reaction (D) solution
- (x) The solvent influences reaction in solutions. It can affect the
 (A) mechanism (B) magnitude of the rate constant
 (C) species involved (D) All the previous
- (3) Answer (T) for True sentences Or (F) for False sentences: (1 Mark for each)
- The reactions involving charges will occur under grossly non-ideal conditions.
 - The actual concentration is that based on the amount of the solute weighed out and the volume of the solution.
 - The solvent increases the potential energy of interaction between the charges.
 - When reaction is between ions of unlike sign, the activated complex has a total net charge less than reactants.
 - The larger the value of relative permittivity, the larger will be the forces of interaction between the charges.
 - In solution, many of the intermediates are at equilibrium concentrations.
 - Reactions between like-charged ions gives a high rate of collision.
 - For ions of like sign, $\Delta S^{\ddagger}$ ions in solution $>$ $\Delta S^{\ddagger}$ molecules in gas
 - Dissociative reactions have higher $\Delta H^{\ddagger}$ values than associative mechanisms.
 - The rate constant increases as pressure increases, and $\Delta V^{\ddagger}$ is negative.

GOOD LUCK

Examiners: Prof. Dr. Bahaa Abu-Zied, Prof. Dr. Ahmed Fawzy

- (iii) Increasing the heating rate in TGA experiment has no effect on the final residue %.
- (iv) Increasing the heating rate shifts the melting point of Nalon 66 polymer in the DSC thermogram towards higher values.
- (v) The glass transition point of a given polymer becomes more obvious on increasing the heating rate during the DSC measurement.
- (vi) TPR curve of the V_2O_5 reduction to V_2O_3 contains only one peak.
- (vii) TPR technique can be used to distinguish between the different oxidation states in Co_3O_4 .

Section (B)

- (1) Write on only one of the followings: (5 marks)
 - (i) Debye-Hückel equations that describe the relations between the rate constant and the ionic strength for very low, higher and very high ionic strengths.
 - (ii) The ways that the solvent influences reaction in solutions.
- (2) Choose the correct answer A, B, C or D (1 Mark for each)
 - (i) When the concentration of solute in a solution increases,
 - (A) solute-solute interactions increase.
 - (B) solute-solvent interactions increase.
 - (C) solvent-solvent interactions modified.
 - (D) All the previous
 - (ii) The, is a measure of the extent to which the electronic distribution over a molecule can be distorted by the electric field of charged particles, or dipolar molecules.

(A) polarizability	(B) solubility
(C) viscosity	(D) permittivity
 - (iii) For reactions between ions of like sign:
 - (A) collision rate and rate constant become greater.
 - (B) collision rate and rate constant become lower.
 - (C) No effect on collision rate and rate constant.
 - (D) None of the previous
 - (iv) For reactions between ions of like sign, solvation effects give a(an) in entropy on activation.

(A) decrease	(B) increase
(C) no effect	(D) None of the previous
 - (v) For reaction between two ions of opposite charge:
 - (A) The overall volume increases with a negative pressure effect.
 - (B) The overall volume decreases with a positive pressure effect.
 - (C) The overall volume decreases with a negative pressure effect.
 - (D) There is no effect on the overall volume and pressure.



Assiut University
Faculty of Science
Chemistry Department



4th July 2024
Time allowed: 3 h

Final Examination in Thermal Analysis & Kinetic Chemistry Course (C690)
Students: Pre-master's in industrial chemistry "Credit Hours System"

Section (A)

Answer the following questions:

- (1) (i) Define the following terms: (1 mark for each)
(A) Curie point (B) isothermal measurements (C) buoyancy effect
(ii) Show how can you differentiate graphically between temperature programmed desorption, reaction, and reduction techniques. (3 marks)
- (2) (i) List only six requirements for good thermobalance design. (3 marks)
(ii) Draw and explain the possible various TGA curves. (3 marks)
- (3) Choose the correct answer A, B, C or D (1 Mark for each)
 - (i) The possible arrangement of commercial TGAs is:
(A) Hang-down thermobalance (B) Top-loading thermobalance
(c) Horizontal thermobalance (D) All of these
 - (ii) Which of the following is not a TGA-instrumental factor?
(A) Sample packing (B) Furnace atmosphere
(C) Sample holder geometry (D) Buoyancy Effect
 - (iii) Which of the following gases suppresses the thermal decomposition of a metal carbonate?
(A) He (B) N₂ (C) CO₂ (D) O₂
 - (iv) The magnitude of the buoyancy effect is more pronounced according to the following gas order:
(A) N₂ > Ar > He (B) Ar > N₂ > He
(C) He > N₂ > Ar (D) He > Ar > N₂
 - (v) Which of the following chemicals is not used in acidity or basicity inspection of a given solid using TPD technique?
(A) CO₂ (B) NH₃ (C) pyridine (D) H₂
 - (vi) In the TPO experiments, the carrier gas employed is:
(A) H₂/Ar mixture (B) O₂/Ar mixture
(C) N₂/Ar mixture (D) pure air
- (4) Answer (T) for True sentences Or (F) for False sentences: (1 Mark for each)
 - (i) Power compensation device is the only type of DSC available instrument.
 - (ii) The buoyancy effect is more obvious using platinum crucible than Al₂O₃ one.

With respect to X-ray diffraction from a crystal. Explain the relationship between the incident beam, the scattered beam and the direction of a crystal for detecting the scattering intensity using Ewald sphere

Prove that the reciprocal lattice for BCC cubic lattice is FCC direct lattice

Question No: 5

Derive simplified expression for F^2 for diamond, including the rules governing observed reflections. This crystal is cubic and contains 8 carbon atoms for unit cell located in the following positions

000	$\frac{1}{2} 0 \frac{1}{2}$	$0 \frac{1}{2} \frac{1}{2}$	$\frac{1}{2} \frac{1}{2} 0$
$\frac{1}{4} \frac{1}{4} \frac{1}{4}$	$\frac{3}{4} \frac{1}{4} \frac{3}{4}$	$\frac{1}{4} \frac{3}{4} \frac{3}{4}$	$\frac{3}{4} \frac{3}{4} \frac{1}{4}$

Type equation here.

Good Luck

Prof R. M. Mahfouz

Assiut university

Academic year 2003/2024

Faculty of science

Time allowed: 2 hours

Chemistry department

Final exam for course No : C-658 for M.Sc. Students in physical chemistry

Answer the following questions

Question No. 1

Identify the crystal system, crystal class and Laue class for the following space groups

$P2_1/m$, $Pma2$, $P422$, $R312$, $P6mm$ and $P432$

Discuss in details all the symmetry elements present in space group $R312$

Question No : 2

AgCl is known to have NaCl type structure. Which of the following indices are allowed in the x-ray diffraction pattern? 100 , 010 , 110 , 111 , 200 , 020 , 012 , 210 , 220 , 211 , 122 and 222 . Write the fraction coordinates of both cations and anions in the lattice

Question No .3

When measuring the x-ray diffraction pattern of the cubic Cs_2TeBr_6 powder sample with $CuK\alpha$ radiation ($\lambda = 1.54 \text{ \AA}$) the following lines were obtained in the scattering angles (2θ) as shown below

36.93 , 42.91 , 62.30 , 74.64 , 78.64 , 94.06 , 105.75 , 109.78 , 127.29 and 143.77°

Index the pattern and compute the lattice parameters

Question No.4



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Q5 (10 marks)

a- Write a short account of the different types of Si solar cells and then explain with a drawing how a solar cell works.

(b) State only the reason for using the KBr in FTIR spectra, and then calculate the Debye temperature, Young's modulus, and hardness for ZnO if $\Delta u = 464.44 \text{ cm}^{-1}$, $\rho_{\text{th}} = 5.79 \text{ (g/cm}^3\text{)}$, $\rho_{\text{ex}} = 5.38 \text{ (g/cm}^3\text{)}$, $W = 81.35 \text{ g}$ and $a = 3.322 \text{ \AA}$



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جامعة أسيوط

Q4 (10 marks)

a- Explain with a drawing why ferromagnetic material can be used in spintronic devices, and then show how you can determine their effective magnetic moment and Curie temperature.

b- Write the main difference between photoluminescence and electroluminescence, and then write a short account about the colour or F-centers with the help of drawings and equations.



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جامعة أسيوط

Q3 (10 marks)

a- State only the main factors affecting the activity of photocatalytic and then explain how the sunlight can be used for water purification.

b- Write the difference between solar and PV cells, and then write a short account of the solar cell efficiency and concentration.



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كلية العلوم
جامعة اسيوط

Q2 (10 marks)

a- Calculate by (nm) the wave lengths related to the lowest and highest energy gap E_g of $Zn_{1-x}Fe_xO$ semiconductors with $(0.00 \leq x \leq 0.20)$ and $E_g \text{ (eV)} = 0.5x^2 + 2x + 3.2$.

b- Write a short account about the core- shell composite and different shapes and then explain why the conductor and insulator are not useful for are not useful for the energy crisis.



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Final Second Term Exam (2023-2024) Time: 3 hrs
Selected Topics Related to Nanomaterials - MSc of Physics (P-664)
Prof. Dr Ahmed Sedky

Answer the following questions

Q1 (10 Marks):

- (a) With equations and drawings, explain how you can determine the specific surface area of nanoparticles.
- (b) With drawings and equations, explain how you can determine the luminescent efficiency.
-

Assiut University
Faculty of Science
Geology Department



جامعة أسيوط
كلية العلوم
قسم الجيولوجيا

Postgraduate Examination (M.Sc.)

Time	Total marks	Gravity and Magnetic Prospecting (602G)	Second Semester June 2024
2 Hrs.	50		

Answer the following question: (17 marks: a. 15 and b. 2)

1. a) Write short notes on direct interpretation of gravity data.
- b) Put true (✓) or false (X) with necessary corrections:
 - i) () Local gravity anomalies attribute to deep buried structures.
 - ii) () A negative gravity anomaly with no magnetic anomaly would indicate a salt dome.

Answer only three questions of the following: (11 marks for each: a. 9 and b. 2)

2. Compare briefly between the air borne magnetic surveying technique and the land magnetic surveying technique.
3. Write short notes on the qualitative interpretation of gravity data.
4. a) Discuss briefly different theories proposed for the concept of isostasy.
- b) What are the main differences between?
 - i) Gravity anomaly over salt domes and anticlines.
 - ii) Local survey and regional surveys.
5. a) Write short notes on application of gravimetry to hydrogeology.
- b) What are the main differences and similarities between gravity and magnetic methods?

GOOD LUCK

المنتحني : د.أ. حمزة احمد إبراهيم

د.أ. عوض عبدالحق عمران

Q2. Answer the following questions:

(28 marks)

1- Evolutionists thought that "metamorphosis" may be an evidence of speciation.

Discuss in details.

2- "Three-spined stickleback fish (marine), after the last glacial period, has undergone speciation into new freshwater colonies in isolated lakes and streams!" Is this logic? Why?

3- Demonstrate briefly Darwin's dilemma in the Origin of Species (1859).

4- "Reproductive isolation can evolve in *Drosophila pseudoobscura* fruit flies by placing them in different media!" Evaluate this claim scientifically.

5- "Polyploidy is a relevant deceptive speciation's claim" Demonstrate in two examples.

6- Is "*Archaeopteryx*" a transitional form between Avis and Reptilia? Why?

7- Compare natural & artificial speciation.

Q3: Give the reason(s):

(10 marks)

1- Gene flow is eventually stopped among different species.

2- Microevolution couldn't be able to give rise to macroevolution.

3- "*Coelacanth*" is a deceptive claim to be a missing link from sea to land animals.

4- Speciation in the studied examples is specious.

5- Evolution concepts couldn't be considered as scientific theories.

----- **END**

د. هناء عاطف

بالتوفيق والسداد



University: Asyut

Total degree = 50

Faculty: Science

Code: 682 Z

Final exam.

Department: Zoology

June 2024

Time: 3 hrs.

Isolating Mechanisms & Speciation

Answer the following questions:

(Note: The questions are in 2 pages)

Q1. Correct over the line based on the evolution point of view: (12 marks)

- 1- According to evolution seven geographic modes of speciation occur in nature.
- 2- Anagenesis is true speciation.
- 3- The relatively rapid change over geological time is the phyletic gradualism.
- 4- parapatric speciation is new species isolated in smaller, peripheral populations prevented from exchanging genes with the main population.
- 5- Secondary speciation has occurred by Wallace effect.
- 6- Evolutionists claimed that Longisquama is the ancestor of land animal.
- 7- Allopatry refers to the formation of two or more descendant species from a single ancestral species all occupying the same geographic location.
- 8- Darwin's finches are examples sympatry.
- 9- Evolutionists claimed in spontaneous generation fish gains, at water, the needed characters on land.
- 10- A population splits into two geographically isolated populations due to geographical change as mountain formation is parapatry.
- 11- Reinforcement favoring reproductive isolation is required for both parapatric and peripatric speciation.
- 12- "Metamorphosis" is the evolutionary process by which reproductively isolated biological populations evolve to become distinct species.

Look behind please!



Assiut University Faculty of Science Department of Zoology	Final exam of Regeneration Biology (Z 680) for M. Sc. students	July, 24 th , 2024 Time: 3 hours Total marks: 50
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Answer the following questions:

- 1- Write on regeneration as a developmental mechanism with attention to its types, different phases of regeneration, the physiological events during regeneration. (20 marks)
- 2- Describe the Blastemal morphogenesis with special reference to proximodistal axis and transverse axes of blastema. (15 marks)
- 3- Write on hormonal and nervous control of regeneration with special attention to the quantitative theory in both. (15 marks)

End of questions..... Best of luck

Dr. Reda A. Ali

Prof. Experimental Embryology



Faculty of Science
Department of
Physics

Medical Physics
Final Exam
2nd semester 2023-2024
Course: Radiobiology and Radiotherapy
Code: P656
Time: 3 Hours
Date: 24-6-2024



Assiut
University

Question # 1

(20 Mark)

Discuss in details

Interaction of photon, heavy charged particles, electrons and neutrons with matter

Question # 2

(15 Mark)

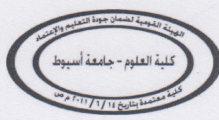
What are X-rays?

Question # 3

(15 Mark)

Write about:

- a) Positron Emission Tomography (PET)
- b) Single Photon Emission Computed Tomography (SPECT)



M.Sc. Exam
Cell Physiology (Z656)

Final Exam 27/6/2024
Period of Exam 3 Hours

Answer the following questions. (50 marks)

- 1-How cells deal with osmosis?
- 2-Write on the five types of neutral amino acids.
- 3- Discuss the three steps of cell signaling
- 4- Mention the venom enzymes and their impact on cell physiology
- 5-Write in detail on the body fluids compartments?
- 6-By diagram show cell signaling in response to steroid hormones.
- 7- What are the types and roles of second messenger in signal transmission in the cell?.

Good Luck!

Dr. Hossam El-Din M Omar, Prof of Physiology, Faculty of Science, Assiut University



Assiut University
Faculty of Science
Zoology Department



Time: 3Hour

Level: MS.C Students
Code: Z 6

Second Semester Histology Exam (2024/06/27)
Answer the following questions: (50 marks)

Q1-Short notes with draw for the followings:-

(20 Marks)

- 1-Structure of skeletal muscle fiber.
- 2-Mast and plasma cells.
- 3-Exocrine gland according to mode of secretion.
- 4-Types of bone cells.

QII-Write in the followings items with draw:-

(15 Marks)

- 1- General characteristics of epithelial tissue.
- 2- Classification of neuron and function of neuroglia.
- 3- Main difference between cartilage and bones.

QIII- Discusses the followings:-

(15 Marks)

- 1- Structure and function of Simple squamous epithelium.
- 2- Classification of glands according to the nature or kind of secretion.
- 3- Compare between different types of cartilage.

Good Luck

Dr. Hanem Saad Abdel-Tawab

Assiut University, Faculty of Science

Zoology Dept.

Post graduate program, Master

Time allowed: 3hr



final exam, 27-06-2024

2nd semester, 2023- 2024

stem cells (z608)

50 marks

Answer the following questions and illustrate your answer with drawings whenever possible.

- 1- Write about cord tissue stem cells, storage of Cord blood, and the advantages and disadvantages of cord blood stem cells. (10 marks)**
- 2- Discuss the hypothesis of Cancer Stem Cell origin and their Niche. (5 marks)**
- 3- Write short note about stem cells markers and their nomenclature. (5 marks)**
- 4- Discuss the origin of iPSCs, the genes required for their pluripotency, and their applications. (5 marks)**
- 5- Define the following terms related to stem cell biology; cancer cell of origin, cancer initiating cell, Clonal analysis, Lineage priming, Plasticity, Progenitor cell, Stemness, Potency and Long-term reconstitution. (10marks)**
- 6- Describe step by step the isolation of murine bone marrow stem cells. (10marks)**
- 7- Discuss the possible role of stem cell in regenerative medicine concerning heart diseases and diabetes. (5 marks)**

End of questions

Best wishes

Course coordinator and Examiner

Dr.Abo bark Eltayeb

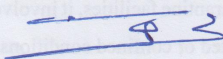
Question 3: give a short account on the following (15 marks)

- a) Salicylic acid as an elicitor of induced systemic resistance in plants.
- b) Vegetative indices in remote sensing.
- c) Biochemical defense mechanisms in plants.

Question 4: write in detail on the following (15 marks)

- a) *Trichoderma* and *Bacillus* in biological control of plant diseases.
- b) Plant disease epidemiology.

With my best wishes
Prof. Dr. Mohamed Hashem



M.Sc. postgraduate students' exam

2nd Semester (2023-2024)

Host-Parasite Relationship (B638)

Time allowed: 2 hours

Score (50 marks)

الاختبار مطبوع على وجهي الورقة

Question 1: Label the correct sentence with (✓) and wrong one with (X) (10 marks)

1. Pathogens that colonize the surface of plants, extracting nutrients through haustoria in epidermal or mesophyll cells are termed endoparasites. ()
2. Cellulolytic enzymes participate directly in disease development by releasing soluble sugars that may be used as nutrients by pathogens. ()
3. The sole object of enforcing domestic quarantine is to prevent the spread of these diseases from infected to non-infected areas. ()
4. Plants surface cells also contain variable amounts of hydrolytic enzymes such as glucanases and chitinases, which may cause breakdown of pathogen cell wall components. ()
5. Utilization of post entry plant quarantine facilities, it involves growing of introduced plant propagating material under isolated or confined conditions. ()

Question 2: Choose the correct answer. (10 marks)

1. is the toxin involved in one of the bacterial bean halo blight.
a- Tabtoxin b- Phaseolotoxin c- Tentoxin d- T-Toxin
2. are organisms that establish an infection in living tissue.
a- Biotrophs b- Hemi-biotrophs. c- Necrotrophs. d- Ectoparasites
3. Important methods followed to prevent the spread of the disease.....
a- Eradication of alternate hosts b- Eradication of collateral hosts
c- Eradication of pathogens d- All
4. The unrequired information for forecasting is.....
a- Host factors b- Pathogen factors c- Environmental factors d- Soil structure
5. is mainly involved in exclusion of specified plants and plant products from a country infested with highly destructive pests
a- Complete embargoes b- Partial embargoes c- Inspection and treatment
d- Inspection and certification

15	An excess of substrate can cause undesirable metabolic waste products to accumulate.	()
16	Agar slants can preserve the fungal isolates for 3-4 years effectively.	()
17	In industrial process lower-cost crude materials are used as sources of carbon, nitrogen, and phosphorus.	()
18	Periodic transfers of cultures prevent the mutations and phenotypic changes in microorganisms.	()
19	Microbial cultures could be stored for years without loss of viability or an accumulation of mutations using lyophilization.	()
20	Low glucose presence at the beginning of the fermentation, can be catabolized to yield ethanol, which is lost as a volatile product and reduces the final yield.	()

Question no (2): Write short notes on five only of the following points (30 Mark)

1. Antibiotic mechanisms of action.
2. Microbial drug resistance.
3. Microbial production of penicillin.
4. Production of itaconic acid by fungi.
5. Advantages and disadvantages of single cell protein manufacturing.
6. Bioethanol production by yeasts.
7. Process involved in the biogas production.

WITH our BEST WISHES

Prof. Saad Shehata El-Maraghy

Prof. Saad sh

Dr. Ghada Abd-Elmonsef Mahmoud

ghada

Assiut university Faculty of Science Botany & Microbiology department		
Industrial microbiology (B640)		
Academic program: M.Sc. (Microbiology)	2 nd Semester 2023-2024	Time allowed :2 hours

Answer the Following Questions

Question no (1): Put true or false in front of each statement and correct the wrong answers (20 marks)

1	Any aerobic process that produces microorganisms (biomass) as the end product called fermentation by biochemist view.	()
2	Aerobic and anaerobic microorganisms are cultured under controlled conditions in large chamber called bioreactor.	()
3	Most of the microorganisms used in the industrial fermentation have anaerobic growth conditions.	()
4	Downstream process is the first step in which biomolecules are grown.	()
5	In continuous fermentation, the fermentation proceeds without the addition of fresh growth medium during the process.	()
6	A fed-batch fermentation strategy can increase the yield from 25% to more than 100% compared with batch fermentation.	()
7	Stirred-tank reactor have internal mechanical agitation and represents the most common used reactor.	()
8	Bubble columns bioreactors are generally more efficient than the airlift ones.	()
9	In solid substrate fermentation, oxygen is more available to the microbial cells.	()
10	External-loop airlift reactors can be easily changed or modified by altering its volume to suit the requirements of different fermentations.	()
11	Higher alcohols, oils, natural esters and silicon are used as antifoaming agents in industrial process.	()
12	The oxygen concentration and flux rate could be low in aerobic fermentation.	()
13	Bacterial growth results in a viscous, plastic medium, known as a non-Newtonian broth, which offers more resistance to stirring and aeration.	()
14	Environmental conditions can be changed or held constant over time, depending on the goals for the particular process.	()

Look in the back



Answer the following: [Total 50 marks]

Q1: Complete the following:

(10 Marks)

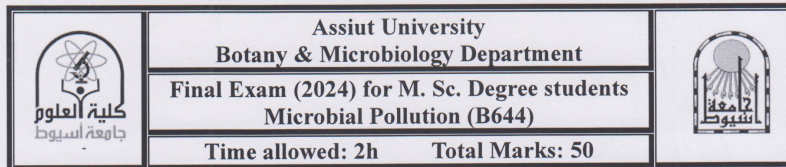
- 1- In protein translation, peptide bond formation is catalyzed by
- 2- Translation of protein consists of three stages, these stages areand.....
- 3- CRISPR abbreviation means
- 4- The respiratory electron flow in eubacteria occurs in whereas in plant cell occurs in
- 5- The Calvin cycle in plant occurs inand in photosynthetic bacteria occurs in
- 6- Lithotrophs mean
- 7- ETC abbreviation means

Q2: Answer on Eight only of the following: 5 marks each (40 Marks)

- A. CRISPR – Cas9 mode of action
- B. Explain the autotrophic CO₂ fixation.
- C. ATP synthesis in prokaryotes
- D. Explain the pathway of Hexose monophosphate (HMP)
- E. Compare between fermentation and aerobic respiration in bacteria.
- F. Explain the pathway of Phosphoketolase
- G. Describe the lipid biosynthesis in bacteria
- H. Importance of phototrophic purple bacteria
- I. photosynthetic pigments in cyanobacteria
- J. Describe the process of protein biosynthesis in bacteria
- K. Explain the pathway of Butyrate – acetate fermentation of glucose
- L. Explain the pathway of Succinate-propionate

Best wishes

Prof. Naeima Yousef



Assiut University	
Botany & Microbiology Department	
Final Exam (2024) for M. Sc. Degree students	
Microbial Pollution (B644)	
Time allowed: 2h	Total Marks: 50

Answer the following questions

Assiut University-Faculty of Science- Geology Department
M. Sc. Examination- Advanced depositional systems (G-642)
Second term, June 2024- Time allowed: 3 hours

Answer the following questions with illustrations (90 marks)

A- Write in detail on the following items (18 marks):

1. Palaeocurrent patterns as a method for environmental diagnosis.
2. Alluvium of meandering rivers.

B- Discuss the following items (18 marks):

1. Environmental parameters.
2. Color as a method for environmental diagnosis.

C- What are the differences between (18 marks):

1. Vertical sequence of facies in active and abandoned alluvial channel.
2. Wave-dominated delta and river-dominated delta.

D- Write in detail on the following items (18 marks):

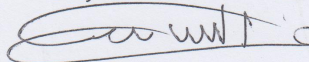
1. Geometry as a method for environmental diagnosis.
2. Carbonate compensation depth.

E- Discuss the following items (18 marks):

1. The basic types of delta.
2. Walter's law and vertical facies changes.

Best wishes

Prof. Dr. Abdalla M. El Ayyat





Master Qualifying Exam, 2024

Course: Applied Micropaleontology, G624

Time Allowed: 3 Hrs

* Total mark= 50 marks

Write an article on FIVE Only of the following:

(Question 1, 10 marks)

Taphonomy and preservability of palynomorphs in sediments.

(Question 2, 10 marks)

Application of palynomorphs in petroleum source rock exploration.

(Question 3, 10 marks)

Marginal palynology.

(Question 4, 10 marks)

Major groups of palynomorphs and their applications.

(Question 5, 10 marks)

Post-depositional alteration of palynomorphs and their thermal maturation.

(Question 6, 10 marks)

Spores, pollen grains, and other palynomorphs in water.

End of Exam

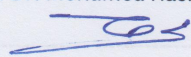
Examiner: Prof. Amr S. Deaf

(Geology Department)

Question 3: Give a detailed account on the following (30 marks)

- Fermentation of algal sugars.
- Problems with ethanol production.
- Fourth-generation feedstock for bioethanol production.
- Maintenance of yeast cultures.
- Morphological characterization of yeast.

With my best wishes
Prof. Dr. Mohamed Hashem



M.Sc. postgraduate students' exam

2nd Semester (2023-2024) Selected Topics Related to Microbiology (B636)

Time allowed: 2 hours Score (50 marks)

الاختبار مطبوع على وجهي الورقة

Question 1: complete the following sentences with only one word for each (10 marks)

1. Agar media with pH is hydrolyzed when autoclaved.
2. is a filament composed of a chain of cells that has been formed by budding.
3., are used to grow algae in a controlled environment and it is an ideal alternative to raceway ponds.
4. Studies reported that using as a substrate which avoid glycerol formation and lipase inhibition during biodiesel esterification.
5. If yeast strains are to be used, the starch must be hydrolyzed as yeast does not contain

Question 2: Label the correct sentence with (√) and wrong one with (X) (10 marks)

1. Microalgae have been used for the production of biodiesel due to their higher oil yields than traditional terrestrial plants. []
2. Yeasts can often grow on media with concentrations of sugar that are low enough to inhibit the development of many bacteria. []
3. Simultaneous saccharification and fermentation (SSF) would need less enzyme loading and produce a higher ethanol yield than Separate hydrolysis and fermentation (SHF). []
4. After the fermentation is over, the cells are separated to get biomass of yeast cells which are used as single cell protein (SCP) for animal's feed. []
5. Endospores are sexual cells that are formed within single cells and in hyphae. []

$$G_2 \quad V_2 = \{v_1, v_2, v_3, v_4, v_5, v_6, v_7\}$$

$$E_2 = \{\{v_1, v_4\}, \{v_1, v_5\}, \{v_1, v_7\}, \{v_2, v_3\}, \{v_2, v_6\}, \{v_3, v_5\}, \{v_3, v_7\}, \{v_4, v_5\}, \{v_5, v_6\}, \{v_5, v_7\}\}$$

(i) Let $f: G_1 \rightarrow G_2$ be a function that takes the vertices of Graph 1 to vertices of Graph 2. The function is given by the following table:

x	a	b	c	d	e	f	g
$f(x)$	v_4	v_5	v_1	v_6	v_2	v_3	v_7

Does f define an isomorphism between Graph 1 and Graph 2?

(ii) Define a new function g (with $f \neq g$) that defines an isomorphism between Graph 1 and Graph 2.

مع أطيب تمنياتنا لكم بالتوفيق والنجاح
أ.د/ فتحي هشام خضر

انتهت الأسئلة

3-a)	Let $(X_1, \leq_1)$ and $(X_2, \leq_2)$ be posets. Define a relation $\leq$ on the Cartesian product $X_1 \times X_2$, according to $(a_1, a_2) \leq (b_1, b_2) \Leftrightarrow a_1 \leq_1 b_1 \text{ and } a_2 \leq_2 b_2$ for all $(a_1, a_2), (b_1, b_2) \in X_1 \times X_2$. Show that $(X_1 \times X_2, \leq)$ is a poset.																																																																																																		
b)	The following Cayley tables define two binary operations $\wedge$ and $\vee$ on the set $L = \{a, b, c, d, e, f\}$ in such a way that $(L, \wedge, \vee)$ becomes a lattice. Draw a Hasse diagram for L . <table><tr><td>$\wedge$</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td></tr><tr><td>a</td><td>a</td><td>f</td><td>c</td><td>a</td><td>a</td><td>f</td></tr><tr><td>b</td><td>f</td><td>b</td><td>c</td><td>b</td><td>b</td><td>f</td></tr><tr><td>c</td><td>c</td><td>c</td><td>c</td><td>c</td><td>c</td><td>c</td></tr><tr><td>d</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td></tr><tr><td>e</td><td>a</td><td>b</td><td>c</td><td>e</td><td>e</td><td>f</td></tr><tr><td>f</td><td>f</td><td>f</td><td>c</td><td>f</td><td>f</td><td>f</td></tr></table> <table><tr><td>$\vee$</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td></tr><tr><td>a</td><td>a</td><td>e</td><td>a</td><td>d</td><td>e</td><td>a</td></tr><tr><td>b</td><td>e</td><td>b</td><td>b</td><td>d</td><td>e</td><td>b</td></tr><tr><td>c</td><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td></tr><tr><td>d</td><td>d</td><td>d</td><td>d</td><td>d</td><td>d</td><td>d</td></tr><tr><td>e</td><td>e</td><td>e</td><td>e</td><td>d</td><td>e</td><td>e</td></tr><tr><td>f</td><td>a</td><td>b</td><td>f</td><td>d</td><td>e</td><td>f</td></tr></table>	$\wedge$	a	b	c	d	e	f	a	a	f	c	a	a	f	b	f	b	c	b	b	f	c	c	c	c	c	c	c	d	a	b	c	d	e	f	e	a	b	c	e	e	f	f	f	f	c	f	f	f	$\vee$	a	b	c	d	e	f	a	a	e	a	d	e	a	b	e	b	b	d	e	b	c	a	b	c	d	e	f	d	d	d	d	d	d	d	e	e	e	e	d	e	e	f	a	b	f	d	e	f
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f	f	f	c	f	f	f																																																																																													
$\vee$	a	b	c	d	e	f																																																																																													
a	a	e	a	d	e	a																																																																																													
b	e	b	b	d	e	b																																																																																													
c	a	b	c	d	e	f																																																																																													
d	d	d	d	d	d	d																																																																																													
e	e	e	e	d	e	e																																																																																													
f	a	b	f	d	e	f																																																																																													
4-a)	Prove that in a bounded distributive lattice, each element has at most one complement.																																																																																																		
b)	Let $\phi: B \rightarrow C$ be a Boolean homomorphism. Prove that (i) If $a, b \in B$ fulfills $a \leq b$ in B , then $\phi(a) \leq \phi(b)$ in C . (ii) $\phi(0_B) = 0_C$ and $\phi(1_B) = 1_C$.																																																																																																		
c)	Consider the two Boolean mappings $f(x_1, x_2, x_3) = (x_1 \wedge x_3) \vee (x_1' \wedge x_2)$ and $g(x_1, x_2, x_3) = (x_1 \vee x_2) \wedge (x_1' \vee x_3) \wedge (x_2 \vee x_3)$ (i) Show that $f = g$. (ii) Consider a circuit that can be represented by any of the Boolean mappings f or g from (i). Find all states of x_1, x_2, x_3 such that current can pass through the circuit.																																																																																																		
5-a)	For which $n \geq 3$ is the graph C_n bipartite?																																																																																																		
b)	Prove that every connected graph which is not itself a tree must have at last three different (although possibly isomorphic) spanning trees.																																																																																																		
c)	Euler's formula ($v - e + f = 2$) holds for all connected planar graphs. What if a graph is not connected? Suppose a planar graph has two components. What is the value of $v - e + f$ now? What if it has k components?																																																																																																		
6-a)	Show that the following formula in CNF is unsatisfiable: $(p \vee q) \wedge (p \vee \neg q) \wedge (\neg p \vee q) \wedge (\neg p \vee \neg q)$																																																																																																		
b)	Consider the following two graphs: $G_1 \quad V_1 = \{a, b, c, d, e, f, g\}$ $E_1 = \{\{a, b\}, \{a, d\}, \{b, c\}, \{b, d\}, \{b, e\}, \{b, f\}, \{c, g\}, \{d, e\}, \{e, f\}, \{f, g\}\}$																																																																																																		



Answer **Five questions only** of the following (10 Marks for every question)

1-a)

Write DNF and CNF corresponding to the following truth table

(i)

p	q	r	truth value
T	T	T	T
T	T	F	T
T	F	T	T
T	F	F	F
F	T	T	F
F	T	F	F
F	F	T	T
F	F	F	F

(ii)

p	q	r	truth value
T	T	T	F
T	T	F	T
T	F	T	F
T	F	F	T
F	T	T	F
F	T	F	F
F	F	T	T
F	F	F	T

b)

Ten members of Math Club are driving to a math conference in a neighboring state. However, some of these students have dated in the past, and things are still a little awkward. Each student lists which other students they refuse to share a car with; these conflicts are recorded in the table below. What is the fewest number of cars the club needs to make the trip? Do not worry about running out of seats, just avoid the conflicts.

J	I	H	G	F	E	D	C	B	A	members
ACFI	EHJ	CI	B	DJ	AI	BF	HJ	ADG	BEJ	Conflicts

2-a)

Write resolution refutations of the following set of clauses. Include line numbers and justifications $\{p, \neg p \vee q, \neg p \vee \neg q \vee r, \neg r\}$

b)

Let $U = \{1, 2, 3, 4\}$ be the universal set

(i) Rewrite $(\forall x \in U)P(x)$ as a conjunction that uses no quantifiers

(ii) Rewrite $\neg(\exists x \in U)P(x)$ as a conjunction that uses no quantifiers

(iii) Rewrite $(\exists x \in U)P(x)$ as a disjunction that uses no quantifiers.

c)

For the following formulas, let the universe be $\mathbb{R}$. Translate each of the following sentences into a formula (using quantifiers):

(i) There is no largest number.

(ii) There is no smallest positive number.

(iii) Between any two distinct numbers, there is a third number not equal to either of them.

- c) Entanglement
 - d) Decoherence
6. In quantum teleportation, which quantum gate is used to entangle the sender and receiver qubits?
- a) Hadamard gate
 - b) CNOT gate
 - c) Pauli-X gate
 - d) Toffoli gate
7. In quantum teleportation, what type of communication is required between the sender and receiver?
- a) Classical
 - b) Quantum
 - c) Telepathic
 - d) None

Question 4:

a- Prove the no-cloning theorem.

b- True/False

- 1- Deutsch's algorithm can solve any problem faster than classical algorithms.
- 2- Deutsch's algorithm requires only a single qubit.
- 3- Quantum teleportation allows for instantaneous transportation of physical objects.
- 4- Quantum teleportation transforms the physical objects between two places.
- 5- In quantum teleportation, the quantum state to be teleported is physically transferred from one location to another.
- 6- Quantum teleportation can be used to transmit classical information faster than the speed of light.
- 7- The success rate of quantum teleportation is always 100%.
- 8- Quantum teleportation requires the use of entangled qubits.
- 9- Classical communication is necessary for the completion of quantum teleportation.
- 10- Quantum teleportation has no practical applications outside of pure research.

Good Luck

Final Exam –2023/2024

Course:	Selected Topics		
Date:	Jun 2024	Time Allowed:	(3) Hours.
No. of Pages:	(2)	Total Marks:	(50) Marks.

Answer the following questions.

Question 1:

Explain in details the power of quantum entanglement for performing quantum computing.

Question 2:

Design the quantum circuit that represents the Boolean expression $f = \overline{x_1}x_4 + x_3\overline{x_2}$

Question 3:

a) Prove the time-complexity of the quantum logical equivalence algorithm.

b- Multiple-Choice Questions

- Deutsch's algorithm is designed to solve which type of problem?
 - Factorization
 - Optimization
 - Boolean function evaluation
 - Quantum simulation
- In Deutsch's algorithm, how many qubits are used?
 - 10
 - 2
 - 12
 - 3
- What is the main advantage of Deutsch's algorithm over classical algorithms?
 - Exponential speedup
 - Polynomial speedup
 - Constant-time complexity
 - Quadratic time complexity
- In quantum teleportation, which of the following is NOT teleported?
 - Quantum state
 - Classical information
 - Entanglement
 - Energy
- Quantum teleportation relies on which principle of quantum mechanics?
 - Superposition
 - Measurement

With respect to X-ray diffraction from a crystal. Explain the relationship between the incident beam, the scattered beam and the direction of a crystal for detecting the scattering intensity using Ewald sphere

Prove that the reciprocal lattice for BCC cubic lattice is FCC direct lattice

Question No: 5

Derive simplified expression for F^2 for diamond, including the rules governing observed reflections. This crystal is cubic and contains 8 carbon atoms for unit cell located in the following positions

000	$\frac{1}{2} 0 \frac{1}{2}$	$0 \frac{1}{2} \frac{1}{2}$	$\frac{1}{2} \frac{1}{2} 0$
$\frac{1}{4} \frac{1}{4} \frac{1}{4}$	$\frac{3}{4} \frac{1}{4} \frac{3}{4}$	$\frac{1}{4} \frac{3}{4} \frac{3}{4}$	$\frac{3}{4} \frac{3}{4} \frac{1}{4}$

Good Luck

Prof. R.M.mahfouz

Assiut university

Academic year 2003/2024

Faculty of science

Time allowed: 2 hours

Chemistry department

Final exam for course No : C-632 for M.Sc. Students (selected topics in inorganic chemistry)

Answer the following questions

Question No. 1

Identify the crystal system , crystal class and Laue class for the following space groups

$P2_1/m$, $Pma2$, $P422$, $R312$ $P6mm$ and $P432$

Discuss in details all the symmetry elements present in space group $R312$

Question No : 2

AgCl is known to have NaCl type structure. Which of the following indices are allowed in the x-ray diffraction pattern? 100 , 010 , 110 , 111 , 200 , 020 , 012 , 210 , 220 , 211 , 122 and 222 . Write the fraction coordinates of both cations and anions in the lattice

Question No .3

When measuring the x-ray diffraction pattern of the cubic Cs_2TeBr_6 powder sample with $CuK\alpha$ radiation ($\lambda = 1.54 \text{ \AA}$) the following lines were obtained in the scattering angles (2θ) as shown below

36.93 , 42.91 , 62.30 , 74.64 , 78.64 , 94.06 , 105.75 , 109.78 , 127.29 and 143.77°

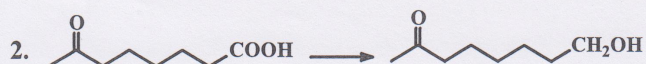
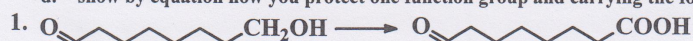
Index the pattern and compute the lattice parameters

Question No.4

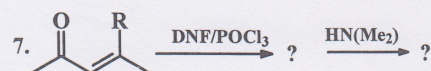
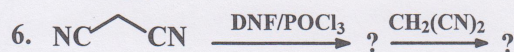
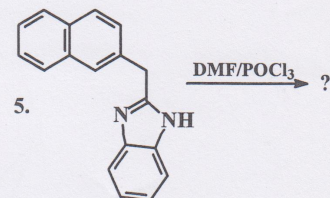
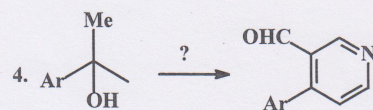
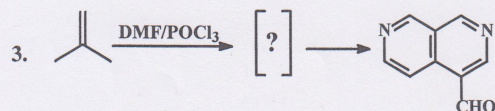
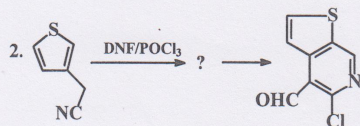
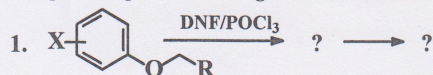
Final exam in 638 C course (selective topics course) for Master students

Answer the following questions:.....(50 marks)

- I. a. Define the protecting group in Organic synthesis?.....(2 narks)
- b. what is the common protecting groups of amino group? (6 narks)
- c. show by equations how you can prepare glycyl alanine?. (6 narks)
- d. show by equation how you protect one function group and carrying the following equation? (6 narks)



- e. a. Mention the types of formylating reactions with the type of reagent and the intermediate for each one.(10 marks)
- b. Complete the products or reagents missed in the following equations:(20 marks)



أجمل الامنيات بالتوفيق اد. عادل محمد كمال

Q 3- Answer the following statistical problem and what the type of the test:
(10 M)

Knowing that; $t_{table} = 2.306$

Mean Hb level of 5 male are 10, 11, 12.5, 10.5, 12 and 5 female are 10, 17.5, 14.2, 15 and 14.1 . Test whether there is any significant difference between Hb values.

- H_0 : There is no significant difference between Hb Level
- H_1 : There is no significant difference between Hb level.

Q 4: From the following table find: (10 M)

- A) The standard deviation
- B) coefficient of variation
- C) relative frequencies distribution

Selling Price (\$ thousands)	Frequency (f)	Midpoint (M)
15 up to 18	8	\$16.5
18 up to 21	23	19.5
21 up to 24	17	22.5
24 up to 27	18	25.5
27 up to 30	8	28.5
30 up to 33	4	31.5
33 up to 36	2	34.5

Q 5: Calculate the following for ANOVA method: (10 M)

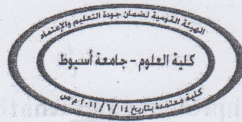
- A) Total sum of squares (SS tot)
- B) Within sum of squares (SS w)

G1	G2	G3
75	80	70
77	82	72
79	84	74
81	86	76
83	88	78

With my best wishes
Prof. Dr. Mona M. Atia



Assiut University
Faculty of Science
Zoology & Entomology
Department



Time: 3 hour
Date : 24/6/ 2024
Course Code: ZM606

Second Semester of Biostatistics

Answer the following questions: (50 marks)

Answer the following questions:

Q1: Define the following:

(10 M)

- | | |
|---|-------|
| A) Non- parametric statistical analysis | (1 M) |
| B) Univariate data variable | (1 M) |
| C) Statistics | (1 M) |
| D) Student T test | (1 M) |
| E) Sample <u>and</u> population | (2 M) |
| F) Variable, and data | (2 M) |
| G) Prism (definition and advantages) | (2 M) |

Q2: Answer the following:

(10 M)

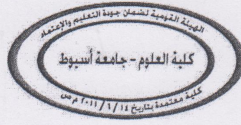
Temperature (in Farahreniet) recorded at 2 am in London on 8 days randomly chosen in a year were as follows:

12, 15 ,16, 12, 15 ,16, 12, 14. Find:

- I. The average temperature for the sample mean.
- II. The median temperature for the sample.
- III. The mode of temperature for the sample.
- IV. The standard deviation for the sample data.
- V. The coefficient of variation for the sample.



Assiut University
Faculty of Science
Zoology & Entomology
Department



Time: 3 hour
Date : 24 /6/ 2024
Course Code:Z658

Final Exam of General Pathology
Answer the following questions: (50 marks)

Answer the following questions:

- 1- Describe fully the different mechanisms of cell injury. (15 marks)
- 2- Describe in details the roles of different types of cells involved in the inflammatory process. (15 marks)
- 3- Describe the possible mechanisms of edema formation with special references to its different causes and types (10 marks)
- 4- Differentiate the following:
 - A) Benign and malignant neoplasms. (5 marks)
 - B) Squamous and basal cell carcinoma. (5 marks)

With my best wishes

Prof. Dr. Mona M. Atia

Assiut University Faculty of Science Geology Department		جامعة أسيوط كلية العلوم قسم الجيولوجيا
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امتحان طلاب تمهيدى ماجستير (ساعات معتمدة)
GIS and Production of Geologic Maps and Cross Sections (G650)

يونيو 2024	50 درجة	الزمن: ساعتان
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Answer the following questions:

- 1- How to making a geologic map using ArcGIS? (13 Marks)
- 2- What are the primary and secondary sources of GIS Data? (13 Marks)
- 3- Write on the key aspects and capabilities of ArcGIS Field Maps mobile app. (8 Marks)
- 4- Compare between the three types of GIS & mapping software. (8 Marks)
- 5- What are the different types of maps? (8 Marks)

GOOD LUCK.....

Dr. Hassan Abbas

Assiut University
Faculty of Science
Geology Department



Date: 4/7/2024
Time allowed: 3 Hours

Advanced Geotectonics (G 638)

Answer the following questions (Illustrating your answers with drawing when possible).

1. Write a concise account on:
 - A) Passive and active margins.
 - B) Extensional duplex.
 - C) Rollover anticline.
 - D) Rift-drift transition.
2. Summarize briefly the different causes leading to the rift formation.
3. Compare and contrast between the models of rifting at the crustal scale.
4. write briefly on faults that develop before and coeval folding in the thrust-fold belts?

With my best wishes
Prof. Dr. Ali A. Khudeir

	Assiut University Faculty of Science Mathematics Dept.	Final Exam 2023/2024 Selected Topics Related to Computer Science Code: MC606	4/7/2024 Level: M.Sc. Time: 3 hours	
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Answer the following questions:

(50 points)

Question 1: (10 points)

- (a) What is the main objective of the research on "Separable reversible data hiding in an encrypted image using the adjacency pixel difference histogram"?
- (b) Mention the problems of reversible data hiding in encrypted images using adaptive Huffman code.

Question 2: (10 points)

- (a) Discuss the advantages and disadvantages of using chaotic maps for applications like cryptography or pseudo-random number generation.
- (b) What is the significance of using the adjacency pixel difference histogram method?

Question 3: (10 points)

- (a) What is the benefit of Deep Convolutional Neural Network (CNN) in image encryption?
- (b) Why is it important to consider lighting and shadow inconsistencies in detecting forged images?

Question 4: (10 points)

- (a) Write about some cryptanalysis techniques.
- (b) Discuss the potential challenges and limitations of using chaotic maps in real-world applications. How can these limitations be addressed through further research or by combining chaotic maps with other techniques.

Question 5: (10 points)

- (a) What is the role of Convolutional Neural Networks (CNNs) in detecting image forgeries?
- (b) In the light of the course, write about a new idea on any topic.



Assiut University
Faculty of Science
Physics Department



Course Name: Medical Imaging Final Exam 2nd semester 2023/2024

Course code: (P654) Date: 27/06/2024 Program: Medical Physics Master Degree

Time Exam: 3 h Total Mark: 50 Mark Student Name:

Answer five questions only from the following.

Q1: What is the ultrasound technology and write on some key aspects of it?

Q2: Briefly discuss the basic principles of magnetic resonance imaging and PET scans usefulness.

Q3: Write on the function process of gamma camera.

Q4: Discuss briefly on the key physics principles involved in CT.

Q5: Write on the different common types of Ct (computed tomography) scans.

Q6: How could we interpret the X-ray film?

Q7: What is medical image processing?

End Of Exam

With all my best wishes

Prof. Dr. Essam F. Abo Zeid



Assiut University
Faculty of Science
Physics Department



Course Name: Medical Imaging Final Exam 2nd semester 2023/2024

Course code: (P654) Date: 27/06/2024 Program: Medical Physics Master Degree

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End Of Exam

With all my best wishes

Prof. Dr. Essam F. Abo Zeid



Assiut University
Faculty of Science
Physics Department



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End Of Exam

With all my best wishes

Prof. Dr. Essam F. Abo Zeid

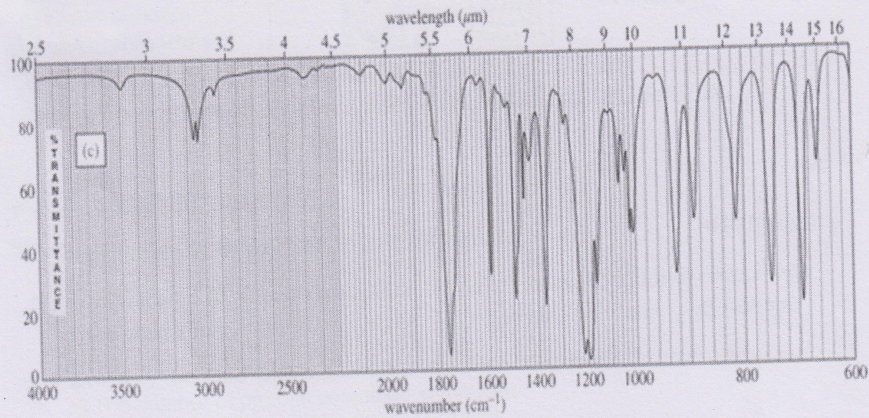


Figure 2

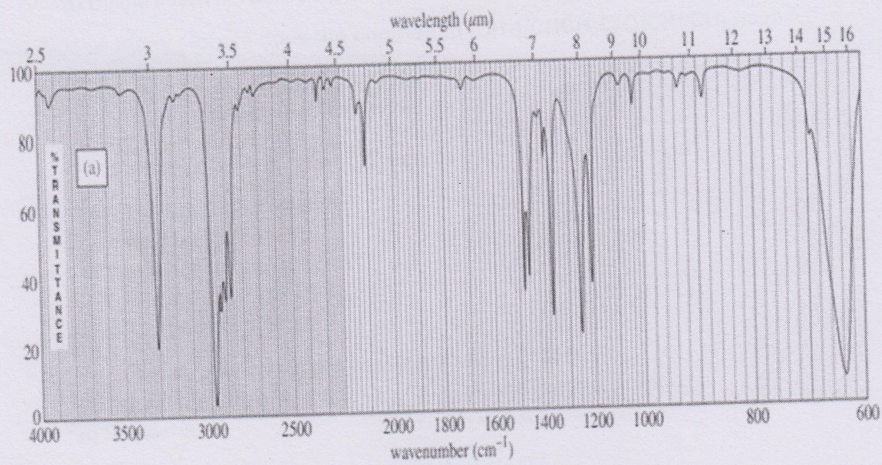


Figure 3

Good Luck

Dr. Ahmed Abdou O. Abeed

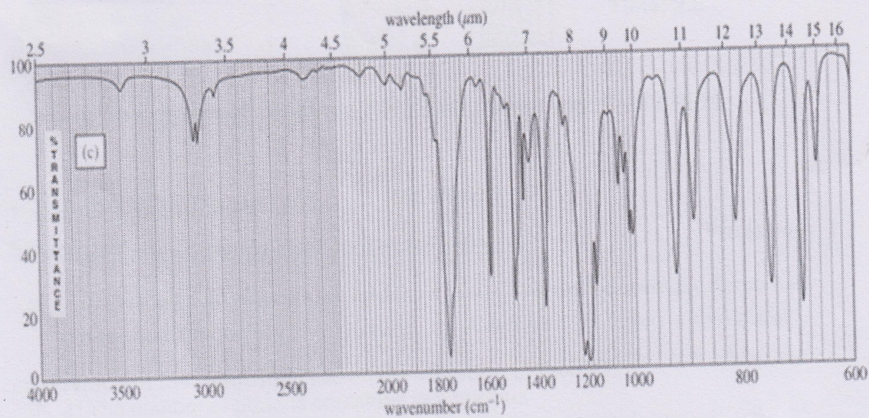


Figure 2

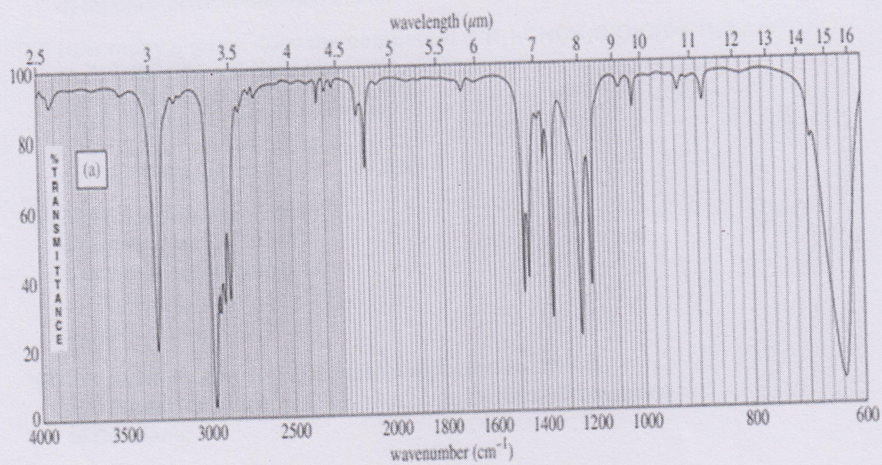
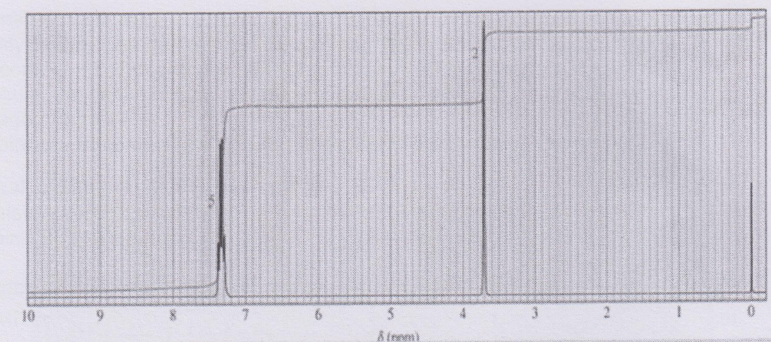


Figure 3

Good Luck

Dr. Ahmed Abdou O. Abeed



Q5- Three IR spectra are shown, corresponding to three of the following compounds. For each spectrum, determine the structure and explain how the peaks in the spectrum correspond to the structure you have chosen. (10 Marks)

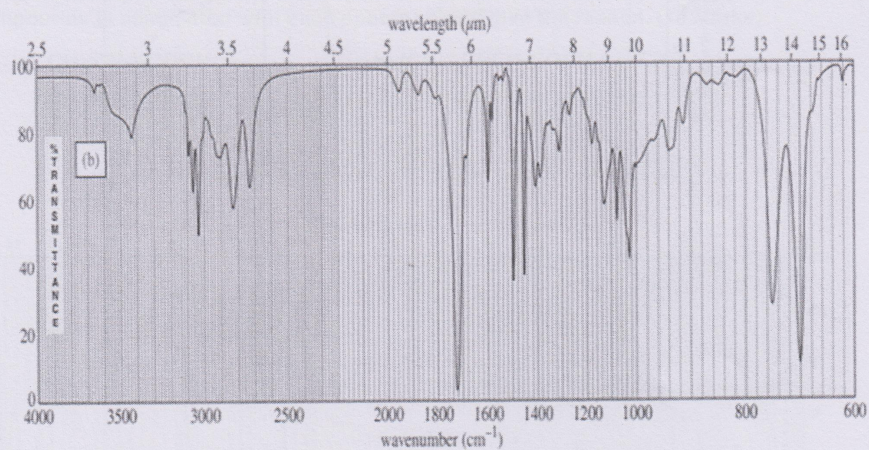
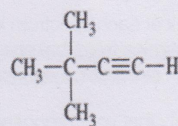
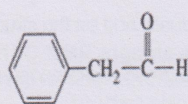
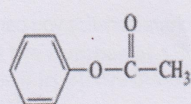


Figure 1

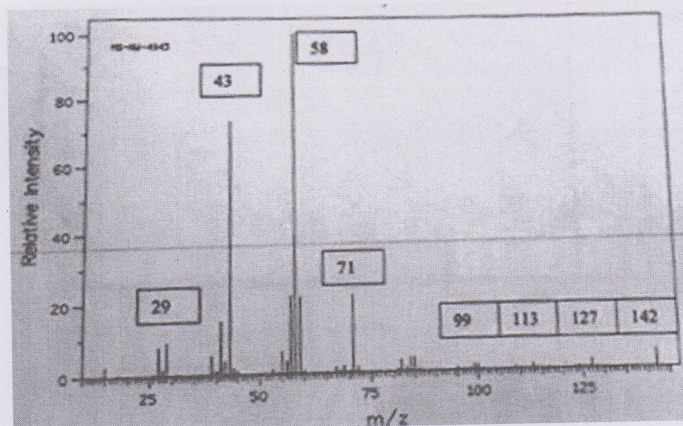
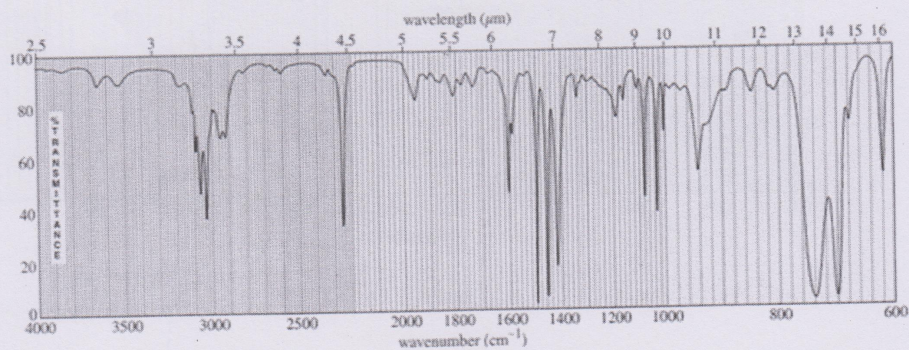
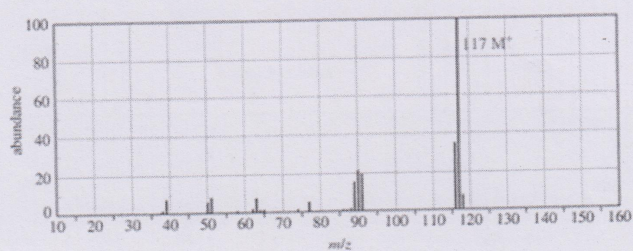


Figure 2

Q4- A compound was isolated as a minor constituent in an extract from garden cress. Its spectra are shown here. (10 Marks)

1. Look at each spectrum individually and list the structural characteristics you can determine from that spectrum.
2. Look at the set of spectra as a group and propose a tentative structure.
3. Verify that your proposed structure accounts for the major features of each spectrum.



cations and radicals.

b) Only cations can be detected by a normal mass spectrometer.

c) A compound whose molecules contain just one bromine atom shows two molecular ion peaks of similar intensity, one at +1 and one at -1 of the average m/z value.

d) Molecular ion peaks always have even-numbered values of m/z .

(9) Signal splitting in NMR arises from

a) Shielding effect.

b) Spin-spin decoupling.

c) Spin-spin coupling.

d) Deshielding effect.

(10) Which of the following statements regarding NMR spectroscopy is wrong?

a) NMR signals towards the left of the spectral chart correspond to larger chemical shifts.

b) Chemical shifts are larger when the frequencies of the radiation which induces the nuclear transitions are higher.

c) Chemical shifts are larger when shielding effects are greater.

d) A hydrogen signal splits into $n+1$ peaks by spin-spin coupling when the number of equivalent hydrogen atoms on adjacent atom(s) is n , and no other neighbouring atoms are involved.

Q2- Predict the number of ^1H and ^{13}C NMR signals at the following compounds and show if IR spectroscopy can give characteristic peaks: (10 Marks)

a) 1,4-dioxane.

b) Vinyl chloride.

c) 1,4-dimethylthiophene.

c) $(\text{CH}_3)_3\text{CCH}_2\text{CHO}$.

Q3- You have provided two Mass spectra shown below. Identify which of the compounds is associated with each spectrum and give the reason. (10 Marks)

a) $\text{CH}_3(\text{CH}_2)_6\text{COCH}_3$

b) $(\text{CH}_3)_2\text{CHCH}_2\text{COCH}_2\text{CH}(\text{CH}_3)_2$

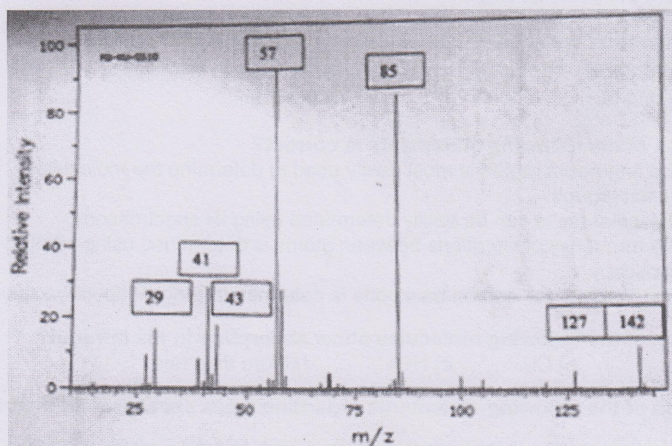


Figure 1



Spectroscopic Analysis (634 C) for Master Degree Students

Answer the following questions: (50 Marks)

(10 Marks)

Q1- Choose the correct answer for the following:

- (1) In an infrared (IR) spectrum, which of the following functional groups has the highest frequency? a) Ketone. b) Aldehyde. c) Ester. d) Alcohol.
- (2) Which of the following causes the vibration of atoms?
 - a) The number of protons contained in a nucleus.
 - b) Electron movement to higher energy levels.
 - c) The molecule's total molecular weight.
 - d) Dipole moments between atoms
- (3) How many signals does the compound $(CH_3)_2CHCH_2C(O)CH=CH_2$ have in 1H NMR and ^{13}C NMR spectra?
 - a) Five 1H signals and six ^{13}C signals.
 - b) Six 1H signals and six ^{13}C signals.
 - c) Six 1H signals and seven ^{13}C signals.
 - d) Five 1H signals and seven ^{13}C signals
- (4) More the shielding effect
 - a) Lower chemical shifts.
 - b) No change in chemical shift.
 - c) Higher the chemical shift.
 - d) More the peak splitting
- (5) For aqueous samples, the useful standard in NMR is:
 - a) Tetramethyl silane.
 - b) Dimethylchloro silane.
 - c) Squalene.
 - d) DMSO.
- (6) Which of the following statements is correct?
 - a.) The fingerprint region is most easily used to determine the molecule's functional groups.
 - b.) Molecular mass can be easily determined using IR spectroscopy.
 - c.) The frequency of vibrations between atoms is determined using infrared spectroscopy.
 - d.) The shape of the carbon backbone is determined using IR spectroscopy.
- (7) Which of the following molecules show absorption in the infrared?
 - a) H_2 .
 - b) Cl_2 .
 - c) HCl .
 - d) More than one.
- (8) Which of the following statements regarding mass spectrometry is wrong?
 - a) In a normal mass spectrometer, electron impact causes a molecule to lose an electron and become a molecular radical cation which decomposes into fragment

- (xi) Degree of scattering in transmission electron microscope is a function of
- Wavelength of electron beam used
 - Number of atoms that lie in the electron path
 - Number and mass of atoms that lie in the electron path
 - Mass of atoms that lie in the electron path
- (xii) What type of electrons are used to form an image in a Scanning Electron Microscope?
- Primary Electrons
 - Secondary Electrons
 - Electrons from an electron beam
 - Core electrons
- (xiii) Which of the following is a similarity between transmission electron microscopy and scanning electron microscopy?
- Both produce images of the 3D structure of the surface of a sample.
 - Both use electrons that pass through the sample.
 - Both use sputtering technique in the sample preparation.
 - None of the above
- (4) Answer (T) for True sentences Or (F) for False sentences: (1 Mark for each)
- Power compensation device is the only type of DSC available instrument.
 - The buoyancy effect is more obvious using platinum crucible than Al_2O_3 one.
 - Increasing the heating rate in TGA experiment has no effect on the final residue %.
 - Increasing the heating rate shifts the melting point of Nalon 66 polymer in the DSC thermogram towards higher values.
 - The noise signal of the XPS spectrum is due to the collision of the electrons that come from inner layers with other electrons of upper layers.
 - In an XPS spectrum, the Auger peaks are usually sharper than the photoelectron peaks.
 - XPS spectral lines are identified by the shell from which the electron was ejected (1s, 2s, 2p, etc.).
 - In Bragg-Brentano XRD geometry, the incident angle, ω , is defined between the X-ray source and the sample.
 - Crystallites smaller than ~120 nm and/or the presence of microstrain may create peak broadening in the XRD peaks.
 - Electron diffraction in TEM allows only the distinction between amorphous and crystalline materials.
 - Energy Dispersive X-ray Spectroscopy) EDS (is an analytical capability that can be used in conjunction with SEM/TEM techniques.
 - During TEM imaging, the use of lower accelerating voltage allows individual nanotubes to be discerned with higher contrast.

GOOD LUCK

Examiner: Prof. Dr. Bahaa Abu-Zied

- (3) Choose the correct answer A, B, C or D (1 Mark for each)
- (i) The possible arrangement of commercial TGAs is:
 (A) Hang-down thermobalance (B) Top-loading thermobalance
 (C) Horizontal thermobalance (D) All of these
- (ii) Which of the following is not a TGA-instrumental factor?
 (A) Sample packing (B) Furnace atmosphere
 (C) Sample holder geometry (D) Buoyancy Effect
- (iii) Which of the following gases suppresses the thermal decomposition of a metal carbonate?
 (A) He (B) N₂ (C) CO₂ (D) O₂
- (iv) The magnitude of the buoyancy effect is more pronounced according to the following gas order:
 (A) N₂ > Ar > He (B) Ar > N₂ > He
 (C) He > N₂ > Ar (D) He > Ar > N₂
- (v) Which of the following equations is incorrect for calculating the kinetic energy (KE) of the ejected photoelectron in an XPS spectrum? (BE = binding energy; Φ_{spec} spectrometer work function; E_{ch} = surface charge energy)
 (A) $KE = h\nu - BE$ (B) $KE = h\nu - BE - \Phi_{\text{spec}}$
 (C) $BE = h\nu - KE - \Phi_{\text{spec}} - E_{\text{ch}}$ (D) None of these
- (vi) Which binding energy order of the C 1s core electron in the following carbons is correct?
 (A) C-H < C-OH < C-Cl < C=O
 (B) C-H < C-OH < C=O < C-Cl
 (C) C=O < C-Cl < C-OH < C-H
 (D) C-Cl < C=O < C-OH < C-H
- (vii) Which of the following forms of Scherrer's formula is correct? (D: crystallite size; λ : X-ray wavelength; β : full width half maximum (FWHM); θ : diffraction angle; K: Scherrer's constant)
 (A) $D = n\lambda \cdot \sin\theta$ (B) $D = K\lambda / (\beta \cdot \cos\theta)$
 (C) $D = n\lambda / (\beta \cdot \cos\theta)$ (D) $D = n\lambda / (\beta \cdot \sin\theta)$
- (viii) Which of the following forms of Bragg's equation is incorrect?
 (A) $n\lambda = 2d \cdot \sin\theta$ (B) $d = n\lambda / (2 \cdot \sin\theta)$
 (C) $n\lambda = d / (2 \cdot \sin\theta)$ (D) None of these
- (ix) Once an electron beam hits a sample during SEM inspection, the sample ejects
 (A) Electrons and x-rays (B) Positrons and gamma rays
 (C) Anti-electrons and ultraviolet rays (D) Neutrinos and radio waves
- (x) Which among the following helps us in getting a three-dimensional picture of the specimen?
 (A) Transmission Electron Microscope (B) Compound Microscope
 (C) Scanning Electron Microscope (D) Simple Microscope

Please turn over for the rest of questions



Assiut University
Faculty of Science
Chemistry Department

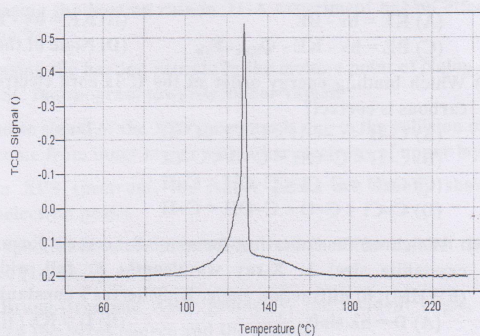


4th July 2024
Time allowed: 3 h

Second Semester Examination
Subject: Selected Topics in Physical Chemistry (C-668)
Students: Pre-master's in physical chemistry "Credit Hours System"

Answer the following questions:

- (1) (i) Show how can you differentiate graphically between temperature programmed desorption, reaction, and reduction techniques. (3 marks)
- (ii) List only six requirements for good thermobalance design. (3 marks)
- (iii) Explain why do Auger lines appear in the XPS spectrum? (3 marks)
- (iv) The Figure below illustrates a TPR profile for a reagent grade silver oxide (AgO) sieved to a minus 325 mesh. Illustrate the TPR behaviour of this oxide and explain the reason for the observed peak broadening at higher temperatures than T_{max} . (3 marks)



- (2) (i) Define the following terms: (4 marks)
 - (A) Curie point
 - (B) Resolving power in microscopy
 - (C) Spin-orbit coupling in XPS spectra
 - (D) fraction decomposed (α) in TGA
- (ii) Compare between the light microscope and the electron microscope. (3 marks)
- (iii) Draw and explain the possible various TGA curves. (3 marks)
- (iv) Give a reason for: (3 marks)
 - (A) Satellites appearance in the XPS spectra.
 - (B) Observation of different heights peaks in the XRD pattern.

Please turn over for the rest of questions



Assiut University
Faculty of Science
Chemistry Department

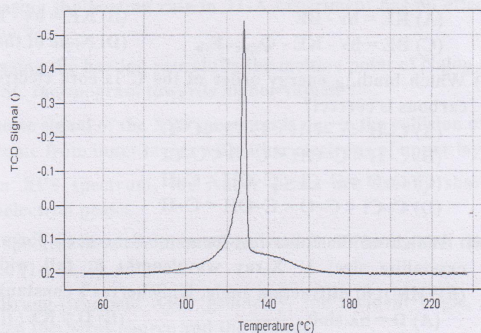


4th July 2024
Time allowed: 3 h

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Please turn over for the rest of questions

Assiut University
Faculty of Science
Chemistry Department

July 2024
Time: 3 hours

Final Exam for Selected Topics in Physical Chemistry (C-668)
MSc in Physical Chemistry

Answer only five of the following:

(10 Marks each)

1. What is a Lennard-Jones potential? Where is it used? Write the expression for it and identify each term in this expression.
2. Compare between covalent and noncovalent interactions, give examples for each of them, mention the importance of the latter and the type of density functionals appropriate for modelling it.
3. What are multi-reference characters? What types of systems have them? How to check for them? How well does DFT perform with these systems?
4. Discuss briefly the five rungs of DFT functionals in order of accuracy and indicate the advantages and disadvantages of each one of them.
5. Discuss the most critical errors in DFT approximations and show how they can be overcome or mitigated.
6. Discuss the choice of a basis set for calculations (size, cardinal number, polarization, and diffusion). What are the important errors for too small basis sets? How can these errors be overcome?

Good Luck

Prof. Dr. AbdelRahman A. Dahy
Dr. Ahmed A. K. Mohammed

(4) Answer (T) for True sentences Or (F) for False sentences: (1 Mark for each)

- (i) Power compensation device is the only type of DSC available instrument.
- (ii) The buoyancy effect is more obvious using platinum crucible than Al_2O_3 one.
- (iii) Increasing the heating rate in TGA experiment has no effect on the final residue %.
- (iv) Increasing the heating rate shifts the melting point of Nalon 66 polymer in the DSC thermogram towards higher values.
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- (xii) During TEM imaging, the use of lower accelerating voltage allows individual nanotubes to be discerned with higher contrast.

GOOD LUCK

Examiners: Prof. Dr. Hasan Sedaira, Prof. Dr. Bahaa Abu-Zied

- (v) Which of the following equations is incorrect for calculating the kinetic energy (KE) of the ejected photoelectron in an XPS spectrum? (BE = binding energy; Φ_{spec} spectrometer work function; E_{ch} = surface charge energy)
- (A) $KE = h\nu - BE$ (B) $KE = h\nu - BE - \Phi_{\text{spec}}$
 (C) $BE = h\nu - KE - \Phi_{\text{spec}} - E_{\text{ch}}$ (D) None of these
- (vi) Which binding energy order of the C 1s core electron in the following carbons is correct?
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 (B) $C-H < C-OH < C=O < C-Cl$
 (C) $C=O < C-Cl < C-OH < C-H$
 (D) $C-Cl < C=O < C-OH < C-H$
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 (D) None of the above

Please turn over for the rest of questions



Assiut University
Faculty of Science
Chemistry Department



4th July 2024
Time allowed: 2 h

Second Semester Examination
Subject: Advanced Instrumental Analysis (C-602)
Students: Pre-Master in Analytical Chemistry "Credit Hours System"

Answer the following questions:

- (1) Write a brief account on each of the following:
 - (i) NMR-spectroscopy principle. (3 marks)
 - (ii) NMR-spectroscopy instrumentation. (3 marks)
 - (iii) Applications of NMR-spectroscopy. (3 marks)
 - (iv) Limitations of NMR-spectroscopy and ways to overcome. (3 marks)
- (2) (i) Define the following terms: (4 marks)
 - (A) Curie point
 - (B) Resolving power in microscopy
 - (C) Spin-orbit coupling in XPS spectra
 - (D) fraction decomposed (α) in TGA
 - (ii) Compare between the light microscope and the electron microscope. (3 marks)
 - (iii) Draw and explain the possible various TGA curves. (3 marks)
 - (iv) Give a reason for: (3 marks)
 - (A) Satellites appearance in the XPS spectra.
 - (B) Observation of different heights peaks in the XRD pattern.
- (3) Choose the correct answer A, B, C or D (1 Mark for each)
 - (i) The possible arrangement of commercial TGAs is:
 - (A) Hang-down thermobalance
 - (B) Top-loading thermobalance
 - (c) Horizontal thermobalance
 - (D) All of these
 - (ii) Which of the following is not a TGA-instrumental factor?
 - (A) Sample packing
 - (B) Furnace atmosphere
 - (C) Sample holder geometry
 - (D) Buoyancy Effect
 - (iii) Which of the following gases suppresses the thermal decomposition of a metal carbonate?
 - (A) He
 - (B) N₂
 - (C) CO₂
 - (D) O₂
 - (iv) The magnitude of the buoyancy effect is more pronounced according to the following gas order:
 - (A) N₂ > Ar > He
 - (B) Ar > N₂ > He
 - (C) He > N₂ > Ar
 - (D) He > Ar > N₂

Please turn over for the rest of questions



Final Exam of Advanced Stereochemistry (636C) for the Master Level students

Answer ALL of the following questions: (50 Marks)

1- Provide a brief description for EIGHT only of the following supported with examples? (8×2 = 16 Marks)

a) Enantioselectivity	b) Centre of symmetry (Ci)
c) Stereospecific reactions	d) diastereotopic ligands or atoms
e) Enantiotopic ligands	f) Tautomerism
g) levorotatory	h) Enantiomeric excess
i) Homotopic ligands	j) Geometrical isomerism in oximes

2- Predict the product(s) for FOUR only of the following reactions and indicating their ratio and stereochemistry of the product(s)? (4×5 = 20 Marks)

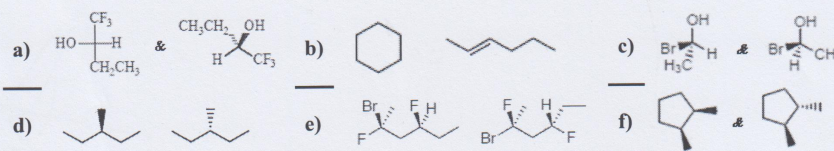
- Replacement of each one of homomorphous hydrogens in *R*-2-butanol with a Cl hetero atom.
- The addition of HCN to the either faces of carbonyl group of (*S*)-3-phenylbutan-2-one.
- Hydrogenation of acetophenone by H₂ in the presence of chiral Ruthenium complex.
- Hydrolysis of epoxides (oxiranes) by the *syn* addition of peroxyacid to *cis*- and *trans*-alkenes.
- Hydroboration-oxidation of 1-methylcyclohex-1-ene by BH₃.

3- Answer ALL of the following with either (T) or (F)? (5 Marks)

(Final answers must be outlined in the answer sheet not here)

- The addition of Grignard reagent RMgX to formaldehyde gives the identical compound ethanols.
- The replacement of two H atom in a methylene carbon of a molecule generates two identical compounds; these two hydrogen atoms are called homomorphous ligands.
- Atropisomerism is a phenomenon related to the restricted rotation about carbon-carbon single bond.
- In 2,4-dibromopentane, there will be always one enantiomeric pair of erythro and one enantiomeric pair of threo stereoisomer exists for a stereoisomers.
- A sample with 70% of one enantiomer and 30% of the other has an *ee* 40%.

4- Label ALL of the following pairs of molecules with the most accurate terms as: constitutional isomers, enantiomers, diastereomers, and identical molecules or different? (6×1.5 = 9 Marks)



Good Luck

Prof. Dr./ Hassan Abdou Koth

Characteristic Infrared Absorption of Organic Compounds		
C - H Stretching		
Alkane	2962 - 2853	
Alkene monosubst. (vinyl)	3040 - 3070	
Alkene disubstit. (cis, trans)	3040 - 3010	
Alkene disubstit. (gem)	3095 - 3070	
Alkyne	~ 3333	
Aromatic	3030 - 3100	
Aldehyde	2720, 2820	
C - H Bending		
Alkane	~ 1340	
Alkane - CH ₂ -	1485 - 1445	
Alkane - CH ₃	1470 - 1430	
	1380 - 1370	
Alkane gem. Dimethyl	1385 - 1380	
	1370 - 1365	
Alkane tert-butyl	1395 - 1385	
	~ 1365	
Alkene, monosubst. (vinyl)	995 - 985	
	915 - 905	
Alkene, disubst. cis	1420 - 1410	
Alkene, disubst. trans	~ 690	
	970 - 960	
	1310 - 1295	
Alkene, disubst. gem	895 - 885	
	1420 - 1410	
	~ 636	
Aromatic Substitution		
Monosubst.	~ 750	
	~ 700	
Disubstit. ortho	~ 750	
Disubstit. meta	~ 780	
Disubstit. Para	~ 820	
C = C Stretching		
Non conjugated	1680 - 1620	
Monosubstituted (vinyl)	~ 1645	
Disubstit., cis	~ 1658	
Disubstit., trans	~ 1675	
Disubstit., gem	~ 1653	
Trisubstit.,	~ 1669	
Tetrasubst. (weak)	~ 1669	
C ≡ C Stretching		
Aromatic skeleton	2100 - 2260	
	1600	
	1580	
	1500	
	1450	
Carbonyl Stretching		
Saturated ketone acyclic	1720	
6 - memb. saturated ketone	~ 1696	
Amides } I	~ 1656	
1 ry } II		
Alcohols		
O - H str. Free	6350 - 3590	
O - H str. associated	3400 - 3200	
Carboxylic Acids		
O - H str. associated	2700 - 2500	
Coupled - OH bending and C - O str.		
1 ry alcohol	~ 1050	
	1350 - 1260	
2 nd alcohol	~ 1100	
	1350 - 1260	
3 ry alcohol	~ 1150	
	1410 - 1300	
Phenols	~ 1200	
	1410 - 1316	
Amines N - H str		
1 ry amine	~ 3506	
	~ 3400	
	~ 3500 - 3310	
2 nd amine	3136 - 3036	
Amine salt		
Amines N - H bending		
1 ry amine	1656 - 1590	
2 nd amine	1650 - 1550	
amine salt	1600 - 1575	
	~ 1500	
	2260 - 2240	
C ≡ N stretching		

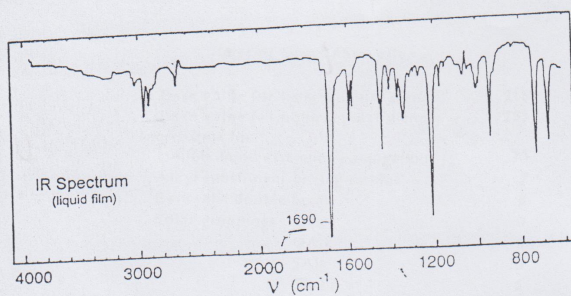
Rules of Diene Absorption

Base value for heteroannular diene	214
Base value for homoannular diene	253
Increments for	
Double bond extending conjugation	30
Alkyl substituent or ring residue	5
Exocyclic double bond	5
Polar groupings: OAc	0
OAlk	6
SAlk	30
Cl, Br	5
N(Alk) ₂	60
Solvent correction	0
$\lambda_{calc} = \text{Total}$	

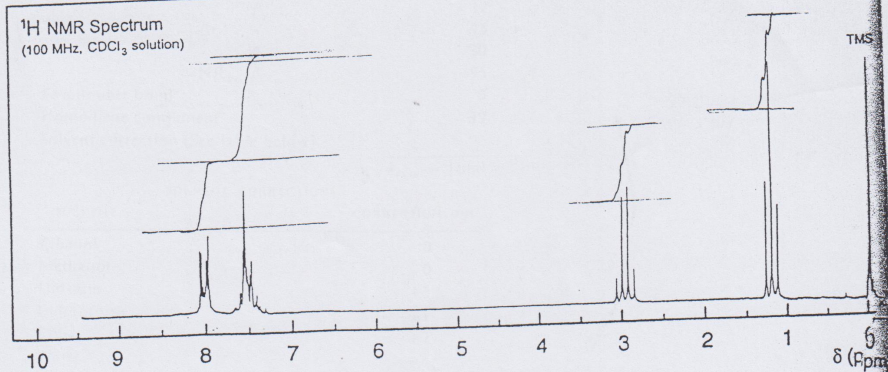
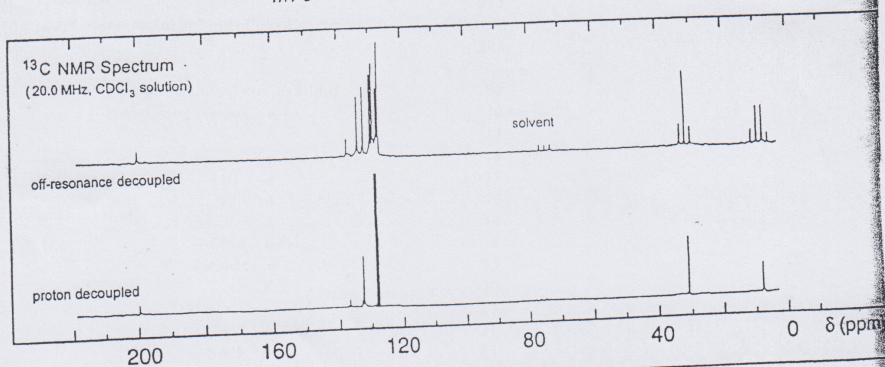
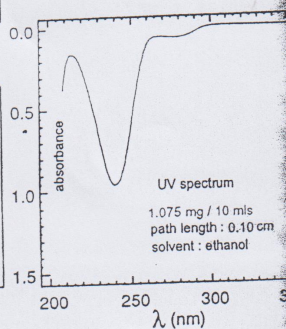
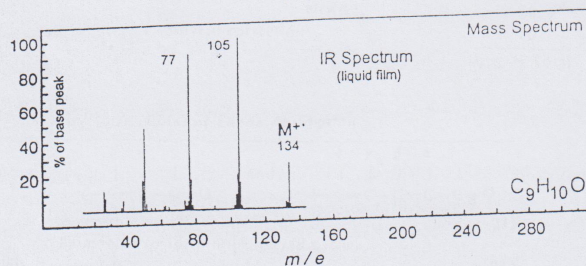
Rules of Enone Absorption

β α		δ γ β α
$\begin{array}{c} & & \\ \beta - C - C - C = O \end{array}$	and	$\begin{array}{c} & & & \\ \delta - C = C - C = C - C = O \end{array}$
Base value acyclic enone		215
Base value to form 6-membered cyclic enone		215
Base value to form 5-membered cyclic enone		202
Increments for		
Double bond extending conjugation		30
Alkyl group, ring residue	α	10
	β	12
	γ and higher	18
Polar groupings: --OH	α	35
	β	30
	δ	50
	--OAc α, β, δ	6
	--OMe α	35
	β	30
	γ	17
	δ	31
	--SAlk β	85
	--Cl α	15
	β	12
	--Br α	25
	β	30
	--NR ₂ β	95
Exo double bond		5
Homodiene component		39
Solvent correction (See table below)		
$\lambda_{calc} = \text{Total}$		

SOLVENT	SOLVENT CORRECTIONS	CORRECTION mμ
Ethanol		0
Methanol		0
Dioxane		+5
Chloroform		+1
Ether		+7
Water		-8
Hexane		+11
Cyclohexane		+11

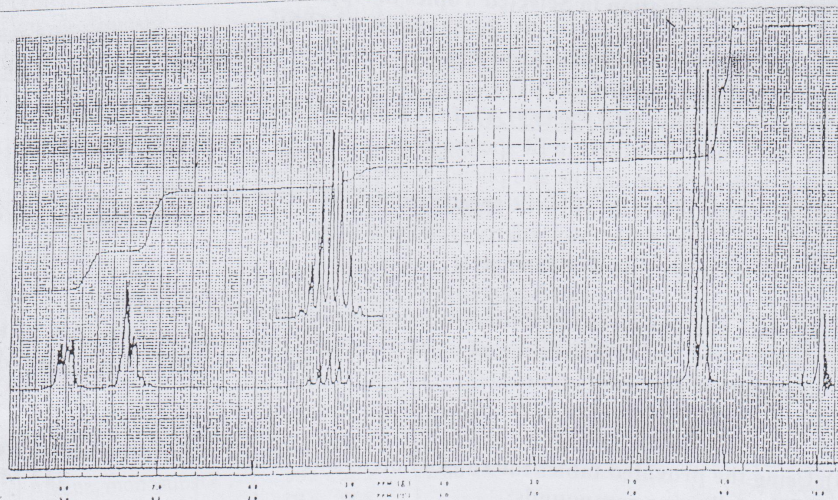


Compound B



- 5) You are provided with ^1H NMR spectrum of compound A having the molecular formula $\text{C}_{10}\text{H}_{12}\text{O}_2$, which is the suitable structure from the following, illustrating your choice by interpretation of spectra: (6 Marks)
- a) $\text{C}_6\text{H}_5\text{COOCH}_2\text{CH}_2\text{CH}_3$ b) $\text{C}_6\text{H}_5\text{COOCH}(\text{CH}_3)_2$ c) $\text{C}_6\text{H}_5\text{CH}_2\text{COOCH}_2\text{CH}_3$

Compound A



- 6) You are provided in the next page with UV, IR, MS, ^1H NMR and ^{13}C NMR of compound B having the molecular formula $\text{C}_9\text{H}_{10}\text{O}$ in the attached paper (8 Marks)
- Write the different probable structures which can be represented by this formula.
 - Assign the suitable structure which agrees with the provided spectra, give reason for your assignment and show the fragmentation pattern of IR, ^1H NMR, ^{13}C NMR which confirms your answer.

GOOD LUCK
With My Best Wishes

Prof. Dr./ Remon Melad Zaki



Assuit University
Faculty of Science
Chemistry Department



Time: 3 hours
Date: 1st July 2024

Final Examination in Selected Topics in Applied Industrial Chemistry for
M. Sc. Students (C-696)

Answer the following questions:

(50 Marks)

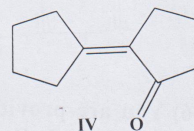
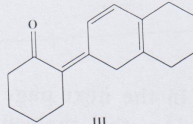
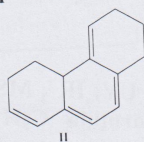
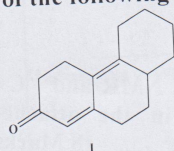
(12 Marks)

1) Describe briefly **THREE ONLY** of the following statements:

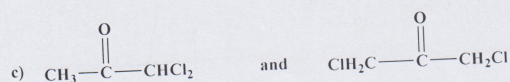
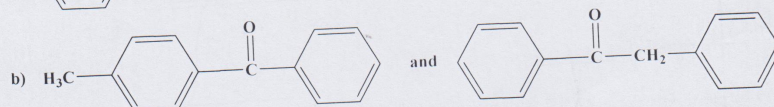
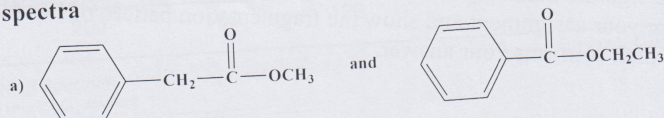
- Molecular vibrations in IR spectroscopy.
- Effect of PH on aniline and phenol in the UV spectra
- Dynamic effect in ^1H NMR spectra using DMF as an example.
- β -Cleavage with McLafferty rearrangement in the mass spectra of carbonyl compounds (Give one example).

2) Explain the appearance of the following peaks at m/z 122, 107, 79, 77, 51 and the significance and appearance of a Meta stable ion peak at m/z 33.8 in the mass spectrum of 1-phenyl ethanol. (6 Marks)

3) Using the provided tables for rules of diene and enone absorption, calculate the λ_{max} of the following compounds: (12 Marks)



4) How can you differentiate between of each pairs of isomers by using IR and ^1H NMR spectra (6 Marks)





**Final Exam on Seismic Prospection (G604)
For Master Students – Second Semester**

July: 2024

Time: 2 hours

Write in details on only FIVE of the following:

1. The stress and strain relation and the different types of seismic waves
2. Reflection, refraction and diffraction of seismic waves
3. Seismic data acquisition systems
4. Seismic data corrections and filtering
5. 4D and vertical seismic profiling surveys
6. Interpretation of seismic reflection data
7. Applications of seismic refraction and seismic reflection surveying

End of questions

Prof. Dr.: Gamal Zidan AbdelAal

Good luck.....

II- Answer the following questions:

A. Answer the following questions:

(20 Marks)

- 1- Discuss the applications of thermogravimetric analysis (TGA) and differential scanning calorimetry (DSC).
- 2- Write short note on the n-type, p-type and p-n junction semiconductors and its applications.
- 3- What is the difference between type I and Type II superconductors and indicate the applications of superconductors.
- 4- Write short note on the Curie-Weiss law for the magnetic materials.
- 5- Compare between the Fluorescence and Phosphorescence phenomena.

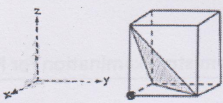
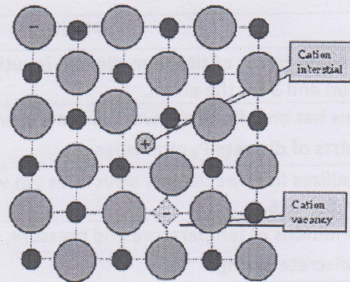
B. Choose the correct answer of the following questions:

(5 Marks)

1. Dielectric materials are
a) Insulating materials b) Semiconducting materials
c) Magnetic materials d) Ferroelectric materials
2. Type I superconductors can produce a magnetic field of order of
a) 100 Tesla b) 10 Tesla c) 5 Tesla d) 0.1 Tesla
3. The ideal superconductors exhibit
a) Monomeric effect b) Meissner effect c) Mesmeric effect d) Mesomeric effect
4. Ionic displacements occur spontaneously and vary with temperature called
a) Piezoelectricity b) Ferroelectricity c) Pyroelectricity d) Electricity
5. Superconductor show perfect.....
a) Paramagnetism b) Diamagnetism c) Ferromagnetism d) Antiferromagnetism
6.obey Curie law
a) Paramagnetic b) Diamagnetic c) Ferromagnetic d) Antiferromagnetic
7. In Curie law, increasing temperature this alignment is more.....and X
a) Easy, decrease b) Difficult, increase c) Easy, increase d) Difficult, decrease
8.obey Curie-Weiss law
a) Paramagnetic b) Antiferromagnetic c) Ferromagnetic d) b & c
9. substances show very large susceptibilities at low temperature
a) Paramagnetic b) Diamagnetic c) Ferromagnetic d) Antiferromagnetic
10. What is the S.I unit of electrical conductivity?
a) Ohm b) Siemens c) Siemens per meter d) Watt

----- Good Luck -----

Prof. Dr. Maher M. Girgis and Prof. Dr. Mostafa Farrag

4	The Miller Indices of the dashed plane in the following crystal is			
				
	a) [110]	b) [111]	c) $[\bar{1}11]$	d) $[1\bar{1}1]$
5	The type of defects present in the following diagram is			
				
	a) Frenkel Defect	c) Schottky Defect	a) Bulk or Volume defects	b) Interfacial defects
6	Crystalline SiO_2 solid is called			
	a) Diamond	b) Glass	c) Quartz	d) None of these

3) Explain what is meant by each of the following terms: (2 Marks)

- i) Intrinsic semiconductors. ii) Dislocations.

4) Give reasons for the following (Support your answer with figures: (6 Marks)

- i) Cation and anion vacancies can exist in ceramics, whereas interstitials can exist for cations but are not normally observed for anions. (2 Marks)
 ii) The addition of small percentage of pentavalent or trivalent impurities in the regular crystal lattice of silicon produces dramatic changes in its electrical properties. (4 Marks)

5) Write on the following: (5 Marks)

- i) Types of solid solutions. (2.5 Marks)
 ii) Describe what happen in the crystal structure when impurities of Ca^{2+} ions are present in a host crystal of NaCl. (2.5 Marks)

True or False

No.	T	F	No.	T	F
1			4		
2			5		
3			6		

The correct answer

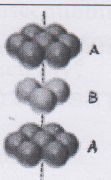
No.	A	B	C	D	No.	A	B	C	D
1					4				
2					5				
3					6				

I- Answer the following question

1) Put (T) in front of the correct phrase and (F) in front of the wrong phrase: (6 Marks)

No	Phrase
1	One of the crystalline forms of titanium dioxide is rutile, in which the coordination numbers are 6 for the cation and 3 for the anion.
2	White phosphorus has an infinite net work structure, whereas the more stable black phosphorus consists of discrete P_4 molecules.
3	Zinc sulfide crystallizes in three distinct structures, in which the cation and anion each have a coordination number of 6.
4	Under normal conditions of temperature and pressure, the two principal allotropes of solid sulfur consist of discrete S_8 rings.
5	The crystal system which correspond to the following structures is simple monoclinic. $a \neq b \neq c, \alpha = \gamma = 90^\circ \neq \beta$ 
6	In the face centered cubic (FCC) lattice each atom is in contact with 8 neighbor atoms

2) Choose the correct answer from the following answers: (6 Marks)

No	Phrase
1	In Hexagonal lattice the coordination number (Z) equals a) 6 b) 8 c) 12 d) None of these
2	 This arrangement of atoms in a crystal structure is known as a) cubic close packing (CCP) b) hexagonal close packing (HCP) c) face centered close packing (FCCP) d) body centered close packing (BCCP)
3	The crystal system which correspond to the following structures is $a = b = c$ $\alpha = \beta = \gamma \neq 90^\circ$  a) Simple orthorhombic b) Simple Tetragonal c) Triclinic d) Rhombohedral

3. Draw the structure and briefly describe the environmental significance of **TWO only** of the following: **(5 points)**

- (a) Alkyl benzene sulphonate (ABS)
- (b) Linear alkyl sulphonate (LAS)
- (c) Polychlorinated Biphenyls (PCBs)

Answer the following Questions:

1. _____ is a substance that does not occur in nature but is introduced by human activity into the environment.
 - (a) Pollutant
 - (b) Contaminant
 - (c) Receptor
 - (d) Environment
2. _____ is an index of the organic content of water, since the most common substance oxidized by the dissolved oxygen in water is organic matter.
 - (a) Biochemical Oxygen Demand (BOD)
 - (b) Total Organic Carbon (TOC)
 - (c) Chemical Oxygen Demand (COD)
 - (d) All of the choices
3. Which of the following elements has low toxicity, but in the hexavalent form it is both toxic and carcinogenic to humans?
 - (a) Cd (II)
 - (b) As (III)
 - (c) Cr (III)
 - (d) Cr (VI)
4. _____ is a deadly poisonous substance, that exists in water as a very weak acid. Its ion forms stable complexes with metal ions and these complexes are relatively less toxic.
 - (A) Ammonia
 - (b) Cyanide
 - (c) Hydrogen sulfide
 - (d) Sulfite ion
5. Which of these gases are the pollutants that cause acid rain?
 - (a) Nitrogen oxides and sulfur dioxide
 - (b) Carbon dioxide and methane
 - (c) Nitrogen oxides and carbon dioxide
 - (d) Carbon dioxide and methane

The End

2. Although there are seven oxides of nitrogen known to occur, the only two that are important in the study of air pollution are nitric oxide (NO) and nitrogen dioxide (NO₂). Describe the environmental significance and write the principal reactions among NO and NO₂ in the atmosphere. **(5 points)**

PART 3: Answer the following questions

1. One of the chemical treatment processes applicable to hazardous waste is the chemical oxidation-reduction method. Explain the using of oxidation-reduction method for the treatment of hazardous waste from the following pollutants: **(5 points)**

- (a) Cyanide wastes.
- (b) Hexavalent chromium Cr(VI).
- (c) Iron (II).

PART II: Match each of the following hazardous waste with a viable treatment/removal agent or method. (note: more than one hazardous waste may be treated by the same way) **(10 points)**

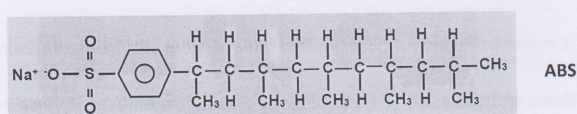
Hazardous waste	Method/Removal agent
1. biologically hazardous wastes	Hydrolysis
2. polychlorinated biphenyls (PCBs) and chlorinated dibenzo-p-dioxins(CDDs)	Ion exchange
3. toxic metals	Wet air oxidation
4. Anionic nickel cyanide complex or chromate ions	Photolysis
5. Halides, carbide, hydride or alkoxide	incineration
6. Cyanide in the electroplating waste solutions	Chemical precipitation using lime [Ca(OH) ₂]
7. Pathogenic microorganisms	lime, Ca(OH) ₂
8. Suspended solids	Hydrazine (H ₄ N ₂) or sulfite (SO ₃ ²⁻)
9. Dissolved oxygen	Al ₂ (SO ₄) ₃ .18H ₂ O
10. Phosphate, PO ₄ ³⁻	Chlorine

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

22. One of the most commonly used techniques for removing soluble organics such as phenols, chlorinated hydrocarbons, surfactants, colour and odour from waste water is _____.
- Adsorption on silicate
 - Electrolysis
 - Addition of ammonia
 - Adsorption on activated carbon
23. What is the non-bioaccumulative organic compound which is suspected to be carcinogens and produced in trace quantities during the disinfection of water by chlorination and which is thought to be harmful at $\mu\text{g l}^{-1}$ concentrations?
- Chloramine.
 - Chloroethane.
 - Chloroform.
 - Chlorobenzene.
24. The ability to accumulate of chemicals pollutants in an organism is measured by the term "Bioconcentration factor (B.F)" which is given by the relation:
- $\text{B.F} = \text{concentration of a pollutant in an organism} / \text{concentration of a pollutant in their tissues.}$
 - $\text{B.F} = \text{concentration of a pollutant in an organism} \times 100$
 - $\text{B.F} = \text{concentration of a pollutant in surrounding water} / \text{concentration of a pollutant in an organism.}$
 - $\text{B.F} = \text{concentration of a pollutant in an organism} / \text{concentration of a pollutant in surrounding water.}$
25. What name is used to describe the tendency for a pollutant which is present at very low concentrations in a water body to get accumulated to an unacceptable level in a food chain.
- Remediation
 - Biomagnification
 - Species magnification
 - Eutrophication

17. Hydrolysis treatment can be used for hazardous waste which are very reactive with water, such as _____.
 (a) Halides and carbide.
 (b) Hydride and alkoxide.
 (c) Active metal.
 (d) All of the choices.
18. Which of the following is the source of NH_3 as water pollutant?
 (a) It is formed during the microbial degradation of decaying biomass and organic matter in water.
 (b) It is released from the anaerobic decay of organic matter containing sulphur.
 (c) It is released from the photolysis of polychlorinated biphenyls compounds.
 (d) All of the choices.
19. For waste treatment, the most popular method used for chemical removal of phosphate is _____.
 (a) Chemical method which used lime, $(\text{Ca}(\text{OH})_2)$ under alkaline conditions.
 (b) Chemical method which used alum, $(\text{Al}_2(\text{SO}_4)_3)$ under alkaline conditions.
 (c) Chemical method which used sodium chloride, (NaCl) under acidic conditions.
 (d) Both (a) and (b).
20. _____ is a very powerful disinfectant that is even more effective against cysts and viruses than chlorine, and it has the added advantage of having no taste or odour problems. But, its disinfective power is limited by its relatively low solubility in water.
 (a) Oxygen
 (b) Ozone
 (c) Nitrogen
 (d) Carbon dioxide
21. The most harmful elements which cases the water pollution are _____.
 (a) calcium and aluminum.
 (b) barium and magnesium.
 (c) iron, lead, cadmium and mercury.
 (d) All of the choices.

12. Which of the following causes water taste problems and has a rotten egg odor?
- Chlorine
 - Benzene
 - Nitrate
 - Hydrogen sulfide
13. Which of the following pollutants metals are formed a mobile and toxic methyl derivatives in regard to their interactions with bacteria in sediments?
- Chromium and cadmium
 - Mercury and Arsenic
 - Lead and copper
 - All of the Choices
14. What is the environmental problem associated with the alkyl benzene sulphonates (ABS)?



- The two ends of the molecule are hydrophilic,
 - The ability to higher surface tension of water,
 - Very slowly biodegradable,
 - Tendency to cause acid rain.
15. What is the chemical method used for the destruction of polychlorinated phenols and pesticides during the treatment of waste hazardous?
- Hydrolysis.
 - Ozonolysis.
 - Acid-Base neutralization.
 - All of the Choices.
16. What is/are the advantages of hazardous wastes incineration?
- It can be scaled to handle large volumes of liquid waste.
 - It is the best known method for the disposal of "mixed wastes".
 - It is an excellent disposal method for biologically hazardous wastes.
 - All of the choices.

6. _____ is more toxic than the pentavalent form, probably because it binds more readily to sulfhydryl groups on proteins.
- Fe (III)
 - Cr (III)
 - As (III)
 - Cd (II)
7. Which of the following is/are the industrial sources of SO₂ as air pollutant?
- nonferrous smelters.
 - oil refining.
 - paper and pulp manufacture.
 - All of the choices
8. Which of the following is true about sulfur dioxide?
- can create smog.
 - can create sulfuric acid, especially in the presence of particulates.
 - released through the combustion of sulfur containing fossil fuels.
 - All of the choices.
9. Which of the following air pollutants gases reacts with haemoglobin (Hb) to convert oxyhaemoglobin (O₂Hb) to carboxy haemoglobin (COHb), and preventing binding with oxygen in red blood cells.
- Sulfur dioxide.
 - Carbon dioxide.
 - Carbon monoxide.
 - Nitrogen oxide.
10. One of the problems that occurs as a consequence of CFC pollution is _____.
- increasing skin cancer in humans.
 - toxins accumulating in homes.
 - damage to human red blood cells.
 - Eutrophication.
11. _____ is a good measure of water quality.
- Dissolved ozone content.
 - Dissolved oxygen content.
 - pH.
 - All of the choices.

Assiut University
Faculty of Science
Chemistry Department

Date: 1/7/ 2024
Time: 2 hours
Instructor: Prof. Dr. M.S. Ibrahim

Environmental Analytical Chemistry (I) M.Sc. (C604)
(Final Exam., Second Semester 2023-2024)

Answer the following Questions:

PART I: Choose the correct answer (one point each)

- _____ is a substance that does not occur in nature but is introduced by human activity into the environment.
(a) Pollutant
(b) Contaminant
(c) Receptor
(d) Environment
- _____ is an index of the organic content of water, since the most common substance oxidized by the dissolved oxygen in water is organic matter.
(a) Biochemical Oxygen Demand (BOD)
(b) Total Organic Carbon (TOC)
(c) Chemical Oxygen Demand (COD)
(d) All of the choices.
- Which of the following elements has low toxicity, but in the hexavalent form it is both toxic and carcinogenic to humans.
(a) Cd (II)
(b) Ar (III)
(c) Cr (III)
(d) Cu (II)
- _____ is a deadly poisonous substance, that exists in water as a very weak acid. Its ion forms stable complexes with metal ions and these complexes are relatively less toxic.
(a) Ammonia
(b) Cyanide
(c) Hydrogen sulfide
(d) Sulfite ion
- Which of these gases are the pollutants that cause acid rain?
(a) Nitrogen oxides and sulfur dioxide
(b) Carbon dioxide and methane
(c) Nitrogen oxides and carbon dioxide
(d) Carbon dioxide and sulfur dioxide

III. MOLECULAR DIAMAGNETISM

TABLE V
PASCAL'S CONSTANTS FOR THE ELEMENTS

H	-2.93	P	-26.3
C	-6.00	As	-43
N open chain	-5.57	Sb ³⁺	-74
N ring	-4.61	Bi	-192
N monoamide	-1.54	Li	-4.2
N diamide, imide	-2.11	Na	-9.2
O alcohol, ether	-4.61	K	-18.5
O aldehyde, ketone	+1.73	Mg	-10
O carboxyl group	-3.36	Ca	-15.9
F	-11.5	Al	-13
Cl	-20.1	Zn	-13.5
Br	-30.6	Hg ²⁺	-33
I	-44.6	Si	-20
S	-15.0	Sn ⁴⁺	-30 ?
Se	-23.0	Pb	-46
Te	-37.3		

TABLE VI
CONSTITUTIVE CORRECTION CONSTANTS

	+5.5
	+10.6
	+0.8
cyclohexane	+3.0
	+1.8
	+8.2
	each carbon -0.24

TABLE VII

Group	Correction
C ₃ ^α , C ₃ ^γ , C ₃ ^β , C ₃ ^ε	-1.29
C ₄ ^α , C ₄ ^γ , C ₄ ^β , C ₄ ^ε	-1.54
C ₄ ^δ , C ₄ ^θ	-0.48

Answer the following:

1- "The source of variation of magnetic properties with temperature is the disruption of the alignment of molecular magnetic moments"
Discuss the effect of temperature on the magnetic properties giving definition of both Curie and Neel temperatures.

2-a- Describe the Quincke method for the measurement of magnetic susceptibility of liquids.
b- In Quincke method for determination of the magnetic susceptibility of a liquid, it was found that the change in vertical height of the meniscus was 0.25 cm upon application of magnetic field of strength of 25,000 Oersted. Calculate the mass susceptibility of the sample.

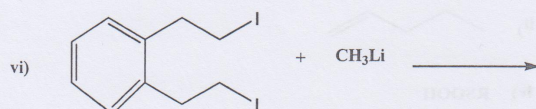
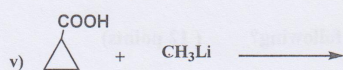
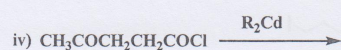
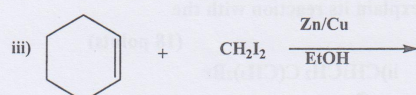
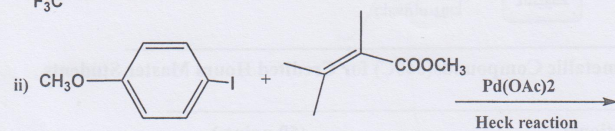
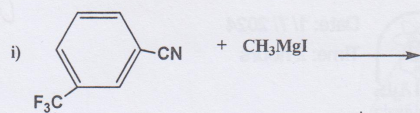
3-a- Discuss the processes which create magnetic field in an atom.
b- "Exchange interactions occur when substance is not magnetically dilute" i- What is the meaning of magnetically diluted
ii- Explain in details an example of this phenomenon.

4-a- "The magnetic moments of $[\text{Et}_4\text{N}_2][\text{NiCl}_4]$ was found to 3.25 and 3.89 B.M at 80K and 300 K respectively" compare these observed values with the calculated spin-only (μ_s) and spin-orbital coupling (μ_{s+l}) magnetic moments. What do you conclude? (Ni^{2+} is d^8)
b- Write the units of the following:
i- magnetic susceptibility
ii- molar magnetic susceptibility

5-a- Find the ground state term and calculate the magnetic momentum of the following ions: i- Pr(III) : $[\text{Xe}]4f^2$ ii- Ho(III) : $[\text{Xe}]4f^{10}$
b- Propyl benzoyl acetate ($\text{C}_6\text{H}_5 - \text{CO} - \text{CH}_2 - \text{COO} - \text{C}_3\text{H}_7$) may exist in either keto-or enol form. Calculate the magnetic susceptibilities of both forms (Pascal's constants are given in the second page)

Good Luck

Examiner: Prof.Dr.Ahmed.H.Osman



GOOD LUCK



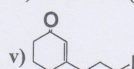
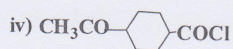
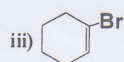
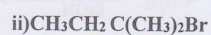
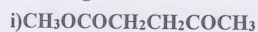
Final Exam. Of Organometallic Compounds(640C) for Credited Hours Master Students

Answer the following questions:

(50 points)

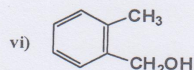
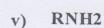
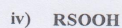
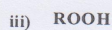
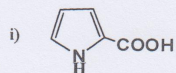
I) How can you prepare Gilman's reagent and explain its reaction with the following:

(18 points)



II) How would you employ Grignard reagent to make the following?

(12 points)



III) Write short notes on Two only of the following : (10 points)

(i) Olefine metathesis

ii) Wilkinson's catalyst in hydrogenation of alkene .

iii) Ziegler-Natta catalyst in polymerization of ethylene.

IV) Predict the final products and give a reasonable mechanism for Two only of the following reactions : (10 points)

5)- Random sampling from two independent normal populations with equal variances produced the following results:

Population 1	$\bar{x} = 40$	$s_1 = 4$	$n_1 = 12$
Population 2	$\bar{y} = 35$	$s_2 = 3$	$n_2 = 15$

- Evaluate 90% CI for the difference between the two population means.
- At $\alpha = 0.05$, test the hypothesis that: $H_0 : \mu_1 = \mu_2$ vs $H_1 : \mu_1 \neq \mu_2$.
- For population 2, test the hypothesis that:
 $H_0 : \mu = 36$ vs $H_1 : \mu < 36$ for $\alpha = 0.01$

6)- For the following data:

	A	B	C
	162	142	126
	142	156	122
	165	124	138
	145	142	140
	148	136	150
	174	152	128
$\bar{X}$	156	142	134
S^2	164.4	131.2	110.4

Construct the ANOVA Table and at $\alpha=0.05$ level of significance, test the hypothesis H_0 that the means for the three treatments A, B and C are equal.

Tabulated values:

$$\Phi(1.0) = 0.8413, \Phi(1.5) = 0.9332, \Phi(0.5) = 0.6915, \Phi(0.75) = 0.7734$$

$$\Phi(a) = P(Z \leq a), Z \sim N(0,1)$$

$$Z_{0.975} = 1.96, Z_{0.995} = 2.58, \chi^2(0.05, 24) = 13.848, \chi^2(0.95, 24) = 36.415,$$

$$t(0.95, 24) = 1.711, t(0.995, 24) = 2.797, t(0.95, 25) = 1.708, t(0.975, 25) = 2.059$$

$$t(0.99, 14) = 2.624, F(0.95, 2, 15) = 3.68,$$

With my best wishes

Professor Zeinuh Jaheen

Answer the following questions:

1) The lifetime of a battery in a certain application is normally distributed with mean $\mu = 16$ hours and standard deviation $\sigma = 2$ hours, compute the probability that:

- a- What is the probability that a battery will last more than 19 hours
- b- the lifetime of a battery is less than 14 hours
- c- the lifetime of a battery is between 14.5 and 17 hours

2)- If 53% of the population have at least some college education. Choose 12 persons at random, find the probability that:

- (i) Fewer than 10 have some college education,
- (ii) At least 3 do not have any college education,
- (iii) At most 7 have some college education.

3)- The contents of seven similar containers of sulfuric acid are 9.8, 10.2, 10.4, 9.8, 10.0, 10.2, and 9.6 liters. Assuming an approximately normal distribution with known standard deviation equal $\sigma = 2$,

- a- Compute the point estimate of the mean of the population.
- b- Find a 95% confidence interval for the mean contents of all such containers.
- c- Test the hypothesis that: $H_0: \mu = 9.8$ VS $H_1: \mu \neq 9.8$ at $\alpha = 0.01$

4)- A sample of size 25 drawn from a normal population provided a sample mean of 14 and a sample standard deviation 4.32. Consider the following hypothesis test:

$$H_0: \mu = 12 \quad \text{VS} \quad H_1: \mu > 12$$

- a. Compute the value of the test statistic and at $\alpha=0.05$, what is your decision?
- b. Construct 99% confidence interval for the population mean.
- c. Construct 90% confidence interval for the population standard deviation.

(II) XPS and EDX (primary and secondary beams)

2. Choose the correct answer:

Code: T 616 (50 %)

(33 Marks)

3. Which region of infrared spectra appears between 1400 - 400 cm^{-1} ?

- A. Functional group region
- B. Fingerprint region
- C. Low frequency region
- D. None of the above

4. Which of the following is not a type of bending molecular vibration?

- A. Twisting

(III) Chemical vapor deposition and physical vapor deposition

5. Absorption spectrum results when an electron in an atom undergoes a transition from ...

- A. Higher energy level to lower one
- B. Lower energy level to higher one
- C. Intermediate level
- D. All of the mentioned

6. The representation of Beer Lambert's law is given as $A = abc$. If b represents distance, c represents concentration and A represents absorption, what does "a" represent?Question 4: Compare between TEM and SEM

(4 marks)

(Electron beam, Nature of Image, Image viewing system, Magnification, Resolution)

7. The Bragg's equation for the diffraction of X-rays is ...

- A. $n\lambda = 2d \sin \theta$
- B. $n\lambda = 2d \cos \theta$
- C. $n\lambda = 2d \sin^2 \theta$
- D. $n\lambda = d \sin \theta$

8. What energy of the electrons is being directly measured by the X-ray photoelectron spectroscopy (XPS) spectrometer?

- A. Thermal energy
- B. Kinetic energy
- C. Binding energy
- D. Potential energy

9. The TGA curve for a prepared sample shows weight gain, this could be due to ...

- A. Oxidation
- B. Reduction
- C. Desorption
- D. Evaporation

10. Which word correctly describes thermal decomposition reactions?

- A. Exothermic
- B. Combustion
- C. Endothermic

WITH MY BEST WISHES

DR. ZINAB HASSANIEN BAKR

Page 4 of 4

19	is the process of conversion of a solution into a solid by converting the substance into insoluble form or by making the solution a supersaturated one.
	A. chemical precipitation method B. electrochemical method C. Physical vapor deposition method D. Sol-gel method
20	is a method that uses a high-frequency wave to heat the starting materials to a high temperature in a short time.
	A. Electrospinning method B. Microwave irradiation method C. Hydrothermal method D. Pulsed laser method
21	For BCC iron, calculate the interplanar spacing in nm between the parallel planes of (220). The lattice parameter of iron is 0.2866 nm.
	A. 0.101 nm B. 0.110 nm C. 0.011 nm D. 9.868 nm
22	Which of the following is NOT a typical application of Thermogravimetric Analysis?
	A. Studying decomposition reactions B. Crystalline structure of materials. C. Measuring the oxygen content D. Determining the presence of hydrated water

Question 2: Put [T] for right or [F] for wrong:

(7 marks)

1	Tauc's relation can be used to determine the energy gap of the materials.	
2	Both anatase and rutile TiO ₂ samples show the same XRD patterns.	
3	It is easier to bend a molecule than stretch it.	
4	Sonochemical synthesis is the process of applying ultrasonic radiation, less than 20 kHz, to molecules to induce chemical reactions.	
5	HR-TEM technique can use to determine the d-spacing value for the sample.	
6	Laser ablation method is a top-down approach.	
7	An example of the physical method for preparing nanomaterials is the ball milling method	

Question 3: Mention one difference between the following.

(6 marks)

(I) SEM and FE-SEM (The electron generation system)

9	The Raman spectrum is said to consist of Stokes lines when A. $\Delta\nu > 0$ B. $\Delta\nu < 0$ C. $\Delta\nu = 0$ D. Does not depend on $\Delta\nu$
10	For a particular vibrational mode to appear in the Raman spectrum, what must change? A. Frequency of radiation B. Intensity of radiation C. Molecule's shape D. Molecule's polarizability
11	Raman effect is a scattering of..... A. Atoms B. Molecules C. Electrons D. Photons
12	Which of the following forces is involved in physical adsorption? A. Gravitational force B. Magnetic force C. Van der Waals force D. Electromagnetic force
13	Sol-gel method is approach. A. Bottom up B. Up bottom C. Top down D. Down top
14	 is a method to get metal nanoparticles from corresponding metal ions. A. Sonochemical reduction B. Pulsed laser method C. Precipitation method D. Sol-gel method
15	The structure of solids is investigated by using A. Microwaves B. Gamma rays C. X-rays D. Infrared rays
16	What will be the absorbance if %T=80? A. 0.5 B. 0.05 C. 0.097 D. 0.97
17	Electrospinning is a common method used to fabricate materials A. 0D B. 1D C. 2D D. 3D
18	 a unique method for preparing crystallizing materials straight from high-temperature aqueous solutions under high pressure. A. Hydrothermal method B. Electrospinning method C. Pulsed laser method D. Chemical vapor deposition

Question 1: Choose the correct answer:

(33 Marks)

1	Which region of Infrared spectra appears between 1400 - 400 cm^{-1} ?
	A. Functional group region B. Fingerprint region C. Low-frequency region D. None of the above
2	Which of the following is not a type of bending molecular vibration?
	A. Twisting B. Stretching C. Wagging D. Rocking
3	Absorption spectrum results when an electron in an atom undergoes a transition from
	A. Higher energy level to lower one B. Lower energy level to higher one C. Intermediates level D. All of the mentioned
4	The representation of Beer Lambert's law is given as $A=abc$. If b represents distance. C represents concentration and A represents absorption, what does "a" represent?
	A. Intensity B. Transmittance C. Absorptivity D. Admittance
5	The Bragg's equation for the diffraction of X-rays is.....
	A. $n\lambda = 2d^2\sin\theta$ B. $n\lambda = 2d\sin\theta$ C. $n\lambda = 2d\sin^2\theta$ D. $n\lambda = d^2\sin\theta$
6	What energy of the electrons is being directly measured by the X-ray photoelectron spectroscopy (XPS) spectrometer?
	A. Thermal energy B. Kinetic energy C. Binding energy D. Potential energy
7	The TGA curve for a prepared sample shows weight gain, this could be due to.....
	A. Oxidation B. Reduction C. Desorption D. Evaporation
8	Which word correctly describes thermal decomposition reactions?
	A. Exothermic B. Combustion C. Endothermic D. Oxidation



كلية العلوم - قسم الجيولوجيا



جامعة أسيوط

امتحان طلاب تمهيدى ماجستير (ساعات معتمدة)

مقرر (G 634) جيولوجيا تركيبية وتكتونية متقدمة

Advanced Structural Geology and Tectonics

الزمن : ٣ ساعات

الدرجة الكلية (٥٠ درجة)

يونيه ٢٠٢٤

Answer Only Four of the following Questions: (12.5 Marks each)

Illustrate your answer with drawings when possible.

- 1- Write in some detail on the tectonic units of Egypt.
- 2- Compare and contrast between the structural model of the Gulf of Suez and the Gulf of Aqaba.
- 3- Give an account on the geometry and kinematics of inversion tectonics.
- 4- Write a brief account on the Mesozoic Volcanicity in Egypt.
- 5- Discuss the tectonic evolution of the Great African Rift System.

GOOD LUCK

Prof. Dr. Moustafa M. Youssef

بسم الله الرحمن الرحيم

ASSIUT UNIVERSITY
FACULTY OF SCIENCE
GEOLOGY DEPARTMENT

جامعة أسيوط
كلية العلوم
قسم الجيولوجيا

الزمن : 3 ساعات

إمتحان الدراسات العليا (ماجستير)

يونيو 2024

جيولوجيا

Phanerozoic

WRITE ON THREE OF THE FOLLOWING SUBJECTS:

QUESTION 1:

The Triassic, Jurassic and Cretaceous Time scale; their stage divisions and absolute age estimates of the boundaries between different stages

QUESTION 2:

The integrated microfossil zonation for the Upper Cretaceous stages and their zonal markers

QUESTION 3:

The Paleogene chronostratigraphy including the planktonic foraminiferal and nannofossil biostratigraphic zones and their datum global events

QUESTION 4:

The Neogene chronostratigraphy including the planktonic foraminiferal and nannofossil biostratigraphic zones and their datum global events

-----Good Luck-----Prof. Khaled Ouda

Assiut University
Faculty of Science
Geology Department



Second Semester Exam
For M.Sc. students
2023-2024
Time allowed: 3 hours

Subject: *Sedimentary Basin Analysis (G 636)*

Answer the following questions: (50 Marks)

1. Write brief notes on the factors controlling basin formation. (9 Marks)
2. Mention in brief the methods used to reconstruct the thermal history of sedimentary basins. (8 Marks)
3. Answer only ONE question of the following: (10 Marks)

A- Many worldwide explanations have been applied for the formation of sedimentary basins, write about them illustrating your answer with drawings.

B- Write in brief on the genetic classifications of sedimentary basins.

4. Sedimentary basins are economically important due to their hydrocarbons accumulation, write on the age and TOC content of the source rocks of Abu Gharadiq and Komombo basins. (5 Marks)
5. Write on the stages of rifting, illustrating your answer with drawings. (6 Marks)
6. How are the sedimentary basins formed in Africa? (3 Marks)
7. Define the following illustrating your answer with drawings. (4 Marks)
 - a) Foreland basins
 - b) Impactogen basins
8. Compare between passive and active rifting illustrating your answer with drawings. (5 Marks)

Ezzat A. Ahmed

Good Luck

13- White pulp of the spleen contains mostly:

- a. Water
- b. Macrophages
- c. Red blood cells
- d. Lymphocytes

14- Which of the following cell types is characterized by numerous rER, Golgi apparatus and zymogen granules?

- a. Mucous neck cells
- b. Chief cells
- c. Parietal cells
- d. Surface epithelial cells

15- Major mineralocorticoids hormone is which of the following:

- a. Adrenaline
- b. Thyroxin
- c. Noradrenaline
- d. Aldosterone

II- Mention whether each of the following statements is true (T) or false (F) and correct the false one. (10 marks)

SN	Statement	(T) or (F)
1-	Neurosecretory cells of the hypothalamus give rise to axons which travel to the neurohypophysis.	
2-	Podocytes form the visceral layer of Bowman's capsule.	
3-	The primary target of the releasing and inhibiting hormones of the hypothalamus is the anterior pituitary.	
4-	Follicle stimulating hormone (FSH) is secreted by mammothrophs.	
5-	Somatotrophs secretes antidiuretic hormone (ADH) and oxytocin.	
6-	There is no connective tissue actually between the hepatic cells.	
7-	Eccrine sweat glands are numerous on the foot of soles and their ducts open into the upper part of the hair follicle.	
8-	The fundic glands of the stomach are present in the muscularis mucosa.	
9-	The zona fasciculata occupies 15% of the cortex.	
10-	The lumen of the pancreatic acinus contains a telescoped part of the intercalated ducts, centro- acinar cells.	

III- Give an account on the following: illustrate your answer with graphs whenever possible (25 Marks)

- a. How does a proximal convoluted tubule adapt to its function?
- b. Ultrastructure and function of thyroid follicular cells.
- c. The liver acinus.
- d. The stratum basale of the epidermis.
- e. The difference between the fundus and the pylorus of the stomach.

Best wishes

Name of the examiners:

Prof. Abdallah B. Mahmoud

Prof. Bothaina M. Khidr

Best wishes



**I- Read the following statements and choose the most appropriate answer for each:
(15 marks)**

- 1- The four small glands in the thyroid gland are known as :
 - a. Adrenal gland
 - b. Pineal gland
 - c. Parathyroid gland
 - d. Endocrine and exocrine gland
- 2- Which cell type are also called c cell?
 - a. Principal cell
 - b. Oxyphil cell
 - c. Parafollicular cell
 - d. Follicular cell
- 3- What connects the pituitary to the hypothalamus?
 - a. Pars intermedia
 - b. Pars tuberalis
 - c. Infundibulum
 - d. Adenohypophysis
- 4- Which of the following is not part of the Adenohypophysis?
 - a. Pars intermedia
 - b. Pars tuberalis
 - c. Pars distalis
 - d. Pars nervosa
- 5- Which of the following is not part of the neurohypophysis?
 - a. Median eminence
 - b. Pars distalis
 - c. Pars nervosa
 - d. Infundibular stalk
- 6- A Malpighian corpuscle is:
 - a. Another name for nephron
 - b. An excretory structure of insects
 - c. Combined name for glomerulus and Bowman's capsule
 - d. None of the above
- 7- A nephron includes all of the following components **except**:
 - a. A renal corpuscle
 - b. A distal convoluted tubule
 - c. A thin limb of the loop of Henle
 - d. A collecting tubule
- 8- What hormone regulates the metabolism of carbohydrates, proteins and fats?
 - a. Sexcorticoids
 - b. Mineralocorticoids
 - c. Glucocorticoids
 - d. None of the above
- 9- Liver cells are:
 - a. Nervous tissue
 - b. Lymphoid tissue
 - c. Epithelial tissue
 - d. Muscle tissue
- 10- The spleen's sinusoids are filled with:
 - a. Salts
 - b. Lymph
 - c. Blood
 - d. Water
- 11- The intralobular ducts of the pancreas are lined with:
 - a. Stratified columnar
 - b. Simple cuboidal
 - c. Simple columnar
 - d. Myoepithelial cells
- 12- The gall bladder lacks:
 - a. An epithelial lining
 - b. Microvilli
 - c. Lamina propria
 - d. Muscularis mucosa, villi and goblet cells

Look at the back of the page for the rest of the exam



Assiut University
Faculty of Science

Botany & Microbiology Department

Course Title: MICROBIAL BIOTECHNOLOGY

Total Degree: 50 marks

June 2024



Academic Program: Ms. C. (Microbiology)

Studying Year: 2023/ 2024

Course Code B 634

Second semester

Allowable Time: Two hours

Q I. Explain only four of the following:
(one)

(20 marks, 5 for each one)

1. The different stages of vaccine production.
2. Insulin production using *Escherichia coli*.
3. How large-scale switch towards a sustainable society based on microbial cell factories?
4. Using the classical approach to select improved microbial strains.
5. What types of results were obtained by studies of transcriptomes?

Q II. What are the importance of the following?

(10 marks, 2.5 for each one)

1. Vaccination.
2. Using genetic engineering to improve microbial strains.
3. Production of large biopharmaceuticals molecules by microbial cell factories.
4. *Pichia pastoris* as a methylotrophic yeast for production of mammalian proteins.
5. Flux-omics after genomic, proteomic, transcriptomic and metabolomics studies.

Q III. Choose the correct answer from the following answers:
(one)

(10 marks, 2 for each one)

1. Diagnostic culture media can be used to measure (qualitative, semi-quantitative, quantitative) microbial metabolites.
2. Dealing with the genomes of the entire community of microorganisms, many of which may not be currently cultivated, which are called (microbiome, microbiota, metagenome).
3. A considerable fraction of petroleum oil entering marine systems is eliminated by (Lipases producing fungi, hydrocarbon-degrading microbes, wood degrading fungi).
4. (Vaccine, Serum, Toxoid) called passive immunity.
5. Insulin Aspart was generated by replacing proline residue at position (21, 28, 30) with aspartic acid in the B-chain.

Q IV. Put a cross (✓) in front of the correct sentence and a cross (x) in front of the incorrect sentence of the following:
(one)

(10 marks, 2 for each one)

1. The only parameter that indicates whether a microbial culture is ready for production is cell mass.
2. β- Glucan is one of the important metabolites produced by yeast.
3. Most enzymes used in the food industry are recombinant products produced by fungi.
4. The immunity granted by the serum leads to the formation of immune cells with long-term memory.
5. Insulin Detemir is a long-acting insulin.

Good Luck...

Prof. Dr.: A. A. Zohri

- (a) Smooth maggots (b) hairy maggots (c) adult (d) both (a & b)

II: Put (✓) and (X): (10 marks).

- 1) Pooling of the blood on the side of the body that is closest to the ground appears in bloat stage ().
- 2) The temporary stiffening of the limbs due to chemical changes in the muscles means rigor mortis ().
- 3) In bloat stage producing foul-smelling chemicals including putrescine and cadaverine ().
- 4) The cheese fly is a species of fly from the family Sarcophagidae ().
- 5) The beetles that eat dead flesh are those that belong to the subfamily Necrophorinae ().
- 6) Blowflies can pick up faint traces of the odor of decay from up to 20 km away and lay their eggs in a suitable corpse ().
- 7) Blow flies are one of the last insects to arrive at a cadaver; they prefer fresh, moist flesh ().
- 8) Adipocere, or corpse wax, may be formed, inhibiting further decomposition in bloat stage ().
- 9) At fresh stage, the microorganisms residing in the digestive system begin to digest the tissues of the body ().
- 10) Most flesh flies breed in dead animals, dung, or decaying material, but a few species lay their eggs in the open wounds of mammals; hence their common name ().

III) Explain one of the following.

- a) Characteristics of phylum Arthropoda? (5 marks)
- b) Using drawing compare between the mammalian TCR and BCR. (10 marks)
- c) In a table compare between the different classes of antibodies. (10 marks)
- d) Compare between passive and active immunity. (5 marks)

End

With best wishes

Dr. Fatma El-Zahraa A. Abd El-Aziz

Dr. Leila Hassan Sayed



selected topics related invertebrates
2023-2024



Assiut University
Department of Zoology
Faculty of Science

Corse Code: Z630
Time: 2 Hours
Total degree: 50

Answer the following questions: Note : Questions are in 2 pages

I: Choose the correct answer :(10 marks).

1. Which of the following statements is true about Entomology?

- (a) the study of Birds (b) the study of Insects
(c) the study of Microbes (d) the study of Parasitic worms

2. Which of the following are the characteristic features of an Insect?

- (a) Pair of antennae (b) three pairs of legs (c) Pair of wings (d) All of the above

3. Hide Beetles belong to family.....

- (a) Histeridae (b) Silphidae (c) Cleridae (d) Dermestidae

4. Insects are classified into the phylum.....

- (a) Nematoda (b) Mollusca (c) Arthropoda (d) Platyhelminthes

5. Remains are usually intact and free of insects instage.

- (a) Fresh (b) Advanced decay (c) autolysis (d) both (a & c)

6. Mainly bones and hair remain. Odor is primarily that of normal soil and litter.

- (a) Days 10-25 (b) Days 5-11 (c) Days 1-2 (d) Days 25+

7. Decomposition of the gastrointestinal tract results in a dark, foul-smelling called.....

- (a) Purge fluid (b) livor mortis (c) autolysis (d) none of them

8. Rigor mortis appears in..... stage.

- (a) bloat (b) fresh (c) dry (d) Advanced decay

9. Phylum : Arthropoda is characterized by....

- (a) includes insects, spiders, & crustacean (b) respiration by spiracles and trachea
(c) have compound eyes (d) All of the above

10. Blowfly maggots are.....



Assiut University



Faculty of Science

Final exam of Selected Topics in Physiology Z652
(Master degree course)
Three hours

Q1: Discuss the following: (12 marks)

- 1- Regeneration of nerve fibers.
- 2- Mechanisms by which neurotransmitters are inactivated.
- 3- Functions and applied physiological disorders of hypothalamus.
- 4- Various degrees of injury of nerve fibers.

Q2: Answer following questions: (15 marks)

- 1- Illustrate with only a diagrammatic figure the composition of CSF.
- 2- Mention the functions of synapse.
- 3- What are neurons and differences between them and other cells in the human body?
- 4- Classical comparison between sympathetic and parasympathetic nervous system.
- 5- Explain properties of reflexes.

Q3: Classify the following: (15 marks)

- 1- Nervous system using a simple scheme explains its components.
- 2- Neuroglia cells with drawing.
- 3- Neurons.
- 4- Neurotransmitters depending upon function.
- 5- Nerve fibers upon structure, distribution, origin and function.

Q4: Define the following: (8 marks)

- 1- Synapse
- 2- Reflex activity.
- 3- Reflex arc and mention its components
- 4- Degeneration of nerve fibers.

With our best wishes
Dr/ Hanan Waly
Dr/ Sohair Mohamed
2024

IV- Chose the correct answer: (one mark each)

- 1) Isotonic fixatives are used to avoid:
(a) Fiber formation (b) crystal formation (c) swelling or shrinking.
- 2) In the cells teased or smeared in the dye and examined after a few minutes.
(a) Supravital staining (b) intravital staining (c) nothing correct
- 3)is especially good for preservation of lipids.
(a) Formal calcium (b) formal saline (c) Bouin
- 4) are non-precipitant fixatives
(a) Osmium tetroxide (b) mercuric chloride (c) alcohol
- 5) are synthetic dyes.
(a) Anilines dyes (b) haematoxylin (c) carmines
- 6) is the most popular dehydrating agent at the present time.
(a) ethanol (b) glycol (c) dioxan
- 7) In material is placed in the staining solution until the proper depth of the colour is reached.
(a) Regressive method (b) progressive method (c) nothing
- 8) is a toxic dehydrating agent and must be vented under hood
(a) Acetone (b) alcohol (c) dioxan
- 9) for studying living cells and organisms without staining we use microscope
(a) Light (b) electron (c) phase

V- Write short notes on two only of the following: (7 marks)

- 1) The methods used for preparing a sample for the transmission electron microscope.
- 2) Chromic aberrations and the correction of these aberrations.
- 3) High voltage electron microscope.

End of questionsBest of Luck

Dr. Reda A. Ali
Prof. Experimental Embryology

Dr. Ekbal T. Wassif
Asst. Prof. Histology



Assiut University Faculty of Science Department of Zoology	Final exam of Developmental Biology & Electron Microscopy (Z 684) for M. Sc. students	July, 1st 2024 Time: 3 hours Total marks: 50
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The Exam is in Two Pages

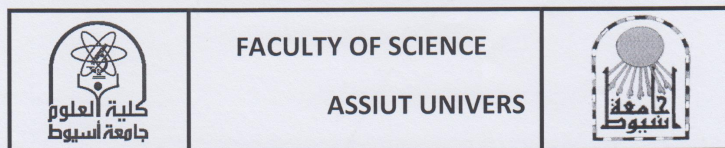
Answer the following questions using labeled drawings when it is possible:

I- Explain in details the process of Limb axis formation with special reference to the role of controlling genes and cell death in the formation of digits and joints. (15 marks)

II- What is the significance of metamorphosis? Describe the hormonal control of metamorphosis and the different ways of animal response to hormonal changes during metamorphosis. (10 marks)

III- Put true or false and correct the false one: (one mark each)

- 1- Carnoy's fluid give excellent preservation of the nuclei ()
- 2- Celloidin is soluble in either acetone or alcohol. ()
- 3- Mordant is used when the affinity between a cell or tissue part and the dye is weak. ()
- 4- Whole mounts are preserved permanently in 70% alcohol ()
- 5- Metachromasia is the staining of the tissue in different colors by one stain. ()
- 6- Fluorescent microscope depends on using visible light. ()
- 7- Silver nitrates and gold chloride are used as stains. ()
- 8- Carbowax is soluble in both water and organic solvent. ()
- 9- Baker's buffered glucose saline solution is used for keeping the active movement of sperm for a long time. ()



Final Exam on Electric & Electromagnetic Prospecting (G603)
Master Students – First Semester

Feb. 2024

Time: 2 hours

Write in details on only ten of the following: (5 marks each)

1. Laboratory measurements of resistivity and dielectric constant
2. Source mechanisms of Self-Potential
3. Origin and characteristics of magnetotelluric fields and telluric currents
4. Airborne electromagnetic systems
5. General interpretation procedures of electromagnetic data
6. Electromagnetic field systems for ground survey
7. Electrode layouts and field procedure for resistivity method
8. Qualitative and quantitative interpretation of resistivity data
9. Sources of induced polarization effects and measurements
10. The problem of ambiguity in geophysical interpretation
11. Interpretation of induced polarization data and applications
12. Limitations of the electromagnetic method
13. Principles of ground penetrating radar (GPR) method and its applications.
14. Antenna selection and depth determination methods in GPR.

End of questions

Good luck

Professor Dr. : Gamal Zidan AbdelAal

Assiut University

Faculty of Science

Dept. of Mathematics

Subject: Partial Differential Equations 1 (M604)

Exam: M.Sc. (June 2024)

Second Term

Time: 3 hours

Total Score: 50 Marks

Answer the following questions: (10 Marks for each question, 5 Marks for each part)

Remark: ($p = z_x$, $q = z_y$, $r = z_{xx}$, $s = z_{xy}$, $t = z_{yy}$, $p_1 = z_{x_1}$, $p_2 = z_{x_2}$, $p_3 = z_{x_3}$).

1-a) Solve the equation $u_{rr} + \frac{1}{r} u_r + \frac{1}{r^2} u_{\theta\theta} = 0$ under the conditions: -

$$u_r = 0 \text{ where } r = a, \quad u_r = v \cos \theta \text{ where } r = b.$$

1-b) Show that the equation $z = 2xp + 2yq + \frac{1}{pqz^3}$ may be reduced to Clairaut type; and find its complete integral and singular solution.

2-a) Find the solution of the Radio equations $V_x = -LI_t$, $I_x = -cV_t$; which satisfies the conditions:-

$$I(x, 0) = I_0 \text{ and } V(x, 0) = V_0 \sin\left(\frac{\pi x}{l}\right).$$

2-b) By Charpit's method, find the complete integral and the singular solution of the equation:

$$z^2(p^2 + q^2 + 1) = 1.$$

3-a) Solve the Laplace equation $u_{xx} + u_{yy} = 0$, under the conditions :-

$$u(0, y) = u(l, y) = u(x, 0) = 0, \quad u(x, a) = \sin\left(\frac{n\pi}{l}x\right).$$

3-b) Find the travelling-wave solution for Burgers equation $u_t + uu_x = u_{xx}$,

$$\text{with } u \rightarrow 0 \text{ as } x \rightarrow +\infty \text{ and } u \rightarrow u_0 (> 0) \text{ as } x \rightarrow -\infty.$$

4-a) Reduce the equation $x^2r + xp + t = 0$, to a canonical form, and find its general solution.

4-b) Apply Jacobio's method to obtain the complete solution of the equation:-

$$x_3^2 p_1^2 p_2^2 p_3^2 + p_1^2 p_2^2 - p_3^2 = 0.$$

5-a) Find the general solution of the equation $2xr - ys + 2p = 4xy^2$.

5-b) Obtain common the complete integral of the following simultaneous equations:-

$$p_1 x_1 + p_2 x_2 - p_3^2 = 0, \quad p_1 - p_2 + p_3 - 1 = 0.$$

Best wishes

Dr. Mohamed A. Abdel - Razeq

Answer only five from the following questions: (10 marks for each question)

[1] Suppose that X is a random variable with probability density function

$$f(X) = \frac{1}{\theta} e^{-\left(\frac{x}{\theta}\right)}, \quad x > 0, \theta > 0$$

Find the probability density function and cumulative distribution function of $Y = \max(X_1, X_2, X_3, X_4, X_5)$ and $Z = \min(X_1, X_2, X_3, X_4, X_5)$ where X_1, X_2, X_3, X_4, X_5 are identical independent random variables from the above probability density function.

[2] For the Weibull distribution with probability density function

$$f(X) = \frac{c}{b} \left(\frac{x-a}{b} \right)^{c-1} e^{-\left(\frac{x-a}{b} \right)^c}, \quad x \geq a.$$

Find: failure rate function, reliability function, and hazard rate function.

[3] Consider the finite mixture of two density function in the following form
 $f(X) = p g_1(x) + (1-p) g_2(x)$, $0 \leq p \leq 1$

Find a procedure for generating a random variable from this finite mixture.

[4] Apply the inverse transform method for generating a random variable from

$$\text{logistic distribution: } f(X) = \frac{1}{\beta} e^{-\left(\frac{x-\alpha}{\beta}\right)} \left(1 + e^{-\left(\frac{x-\alpha}{\beta}\right)} \right)^{-2}, \quad -\infty < x < \infty, \alpha, \beta > 0.$$

[5] Write a Fortran program that can be used to order an array of size n in ascending order $X_1 \leq X_2 \leq \dots \leq X_n$

[6] Describe two different algorithms for generating two random vector $X = (X_1, X_2)$ from the joint probability density function of a random vector $X = (X_1, X_2)$ which is

$$\text{given by } f_{X_1, X_2}(x_1, x_2) = \begin{cases} 6x_1, & x_1 + x_2 \leq 1, \quad x_1, x_2 > 0, \\ 0, & \text{o.w.} \end{cases}$$

Best wishes,

Dr. Ayman Mohamed Abd-Elrahman & Dr. Shereen Ali Mohammed

Assiut University

Faculty of Science

Dept. of Mathematics

Subject: Partial Differential Equations 1 (M604)

Exam: M.Sc. (June 2024)

Second Term

Time: 3 hours

Total Score: 50 Marks

Answer the following questions: (10 Marks for each question, 5 Marks for each part)

Remark: $(p = z_x, q = z_y, r = z_{xx}, s = z_{xy}, t = z_{yy}, p_1 = z_{x_1}, p_2 = z_{x_2}, p_3 = z_{x_3})$.

1-a) Solve the equation $u_{rr} + \frac{1}{r} u_r + \frac{1}{r^2} u_{\theta\theta} = 0$ under the conditions: -

$$u_r = 0 \text{ where } r = a, \quad u_r = v \cos \theta \text{ where } r = b.$$

1-b) Show that the equation $z = 2xp + 2yq + \frac{1}{pqz^3}$ may be reduced to Clairaut type; and find its complete integral and singular solution.

2-a) Find the solution of the Radio equations $V_x = -LI_t, I_x = -cV_t$; which satisfies the conditions:-

$$I(x, 0) = I_0 \text{ and } V(x, 0) = V_0 \sin\left(\frac{\pi x}{l}\right).$$

2-b) By Charpit's method, find the complete integral and the singular solution of the equation:

$$z^2(p^2 + q^2 + 1) = 1.$$

3-a) Solve the Laplace equation $u_{xx} + u_{yy} = 0$, under the conditions :-

$$u(0, y) = u(l, y) = u(x, 0) = 0, \quad u(x, a) = \sin\left(\frac{n\pi}{l}x\right).$$

3-b) Find the travelling-wave solution for Burgers equation $u_t + uu_x = u_{xx}$,

$$\text{with } u \rightarrow 0 \text{ as } x \rightarrow +\infty \text{ and } u \rightarrow u_0 (> 0) \text{ as } x \rightarrow -\infty.$$

4-a) Reduce the equation $x^2r + xp + t = 0$, to a canonical form, and find its general solution.

4-b) Apply Jacobio's method to obtain the complete solution of the equation:-

$$x_3^2 p_1^2 p_2^2 p_3^2 + p_1^2 p_2^2 - p_3^2 = 0.$$

5-a) Find the general solution of the equation $2xr - ys + 2p = 4xy^2$.

5-b) Obtain common the complete integral of the following simultaneous equations:-

$$p_1 x_1 + p_2 x_2 - p_3^2 = 0, \quad p_1 - p_2 + p_3 - 1 = 0.$$

Best wishes

Dr. Mohamed A. Abdel - Razeq

(Q5) A study to determine if the prevalence nature of podiatric problems in elderly diabetic patients are different from those found in a similarly aged group of nondiabetic patients subjects who were seen in outpatient clinics in were (70-90) years old. Among the investigators findings were the following statistics with respect to scores on the measurement of deep tendon reflexes.

Sample	n	Mean	SD
Nondiabetic patients	45	3.5	2.1
Diabetic patients	40	4.6	2.6

We wish to know if the average diabetic patients reduced deep tendon reflexes when compared to nondiabetic patients of the same age at $\alpha = 1\%$.

(Q6) The following table is based on a study of the relationship between race and blood type in a country.

$\begin{matrix} Y \\ \text{Race} \end{matrix}$ $\begin{matrix} X \\ \text{Blood Type} \end{matrix}$	Blood Type				Total
	O	A	B	AB	
Race 1	170	160	110	70	510
Race 2	79	40	50	16	185
Race 3	27	25	60	18	130
Total	276	225	220	104	825

By using $\alpha = 5\%$. Test the null hypotheses that there is no relationship between race and blood type in the country under consideration. And write the contingency table.

You can use the following values.

$Z_{0.45} = 1.65$	$Z_{0.49} = 2.33$	$Z_{0.495} = 2.58$
$P(0 < Z < 3.34) = 0.499$	$P(0 < Z < 1.96) = 0.475$	
$f(0.99, 3, 16) = 5.29$	$\chi^2(0.95, 6) = 12.59$	

Best wishes,

Dr. Hanem Mohamed Mostafa



Answer ONE only from the following questions: (10 marks)

(Q1) Hypersensitivity of the teeth is a pathological condition in which the teeth are sensitive to chemical and physical the patients with dentin hypersensitivity experience pain from hot, cold and sweet. Suppose that a past study showed that 6% potassium nitrate solution reduced dentin hypersensitivity in 48% of the cases. To compare the effectiveness of add 40% of formalin solution to the 6% potassium nitrate. The researchers took a sample of 114 patients who suffer from of these 65 reduce the pain. Can we conclude that the sample of formalin solution reduced the pain test that at $\alpha = 5\%$.

(Q2) The standard drug used to treat a certain disease is known to prove effective within three days in 75% of the cases in which it is used. In evaluating the effectiveness of a new drug in treating the same disease, it was given to 155 persons suffering from the diseases at the end of three days 96 persons had recovered. If the new drug is equally as effective as the standard. What is the probability of observing this in small proportion recovering?

Answer the following questions: (10 marks for each)

(Q3) The breaking strengths of cables by a manufacturer have a normal distribution with mean 822 kg and standard deviation 46 kg. By a new technique the breaking strengths can be increased. To test this claim a sample of 25 cables tested and it is found that the mean breaking strength is 840 kg.

- (a) Can we support this claim at level of significance $\alpha = 1\%$.
(b) Find the P-value.

(Q4) A company researcher wishes to purchase one of the four different machines A, B, C, D in an experiment designed to decide whether there is difference in performance of the machines four experience operators each work on the machines for equate times. The following table shows that the number of units produced. Test the hypotheses that there is no difference between the machines at $\alpha = 1\%$.

Methods	Observations				
A	68	72	75	42	53
B	70	52	60	35	45
C	60	82	47	65	70
D	40	45	70	55	60

- (106) The epidermal and sub-epidermal layer of testa in Brassicaceae is mainly:-
 a. parenchyma b. sclereides c. fibers d. collenchyma
- (107) In Brassicaceae seeds, the inner layer forms the characteristic layer known as:-
 a. waxy layer b. thick sclereides c. hourglass layer d. pigmented layer
- (108) In *Gossypium* seed, the layer that contain abundant starch grains is:-
 a. outer epidermis b. middle zone c. inner epidermis d. inner integument
- (109) In *Gossypium* testa, innermost layer composed of radially elongated cells called as:-
 a. endodermis b. fringe layer c. hourglass layer d. pigmented layer
- (110) Both the integuments participate in the formation of the seed-coat as in:-
 a. *Gossypium* b. Brassicaceae c. pulses d. Leguminosae
- (111) In drupe, the fleshy layer or pith composed of:-
 a. parenchyma b. sclereides c. fibers d. collenchyma
- (112) In berry, the vascular strands present in the:-
 a. exocarp b. mesocarp c. endocarp d. non of the preceding
- (113) In berry, the (2-3) layers below epidermis with thick cell walls is known as:-
 a. endodermis b. mesocarp c. endocarp d. hypodermis
- (114) In *Citrus* fruits, the exocarp contains essential oils thus called:-
 a. flavedo b. albido c. oiledo d. exedo
- (115) In hesperidium, the most of the increase in fruit size is due to increase in thickness of:-
 a. exocarp b. mesocarp c. endocarp d. all of the preceding
- (116) The fibres are oriented in different direction to those in the next layer in the fruit of:-
 a. *Senna* pod b. Tomato berry c. *Citrus* hesperidium d. *Ammi* cremocarp
- (117) In the cremocarp, each mericarp is attached at apices with a thread like called:-
 a. meriphore b. cremophore c. meri-thread d. carpophore
- (118) In *Ammi* cremocarp, each mericarp have:-
 a. two vittae b. five bundles c. four resin ducts d. all of the preceding
- (119) In *Ammi* cremocarp, the commissural surface has:-
 a. two vittae b. five bundles c. four resin ducts d. all of the preceding
- (120) In *Ammi*, the remains of the styles present at the cremocarp apex is called:-
 a. stylocarp b. styloses c. stylopod d. non of the preceding

The second question:-

a- What is cremocarp ? Give an examples

b- Define each of the followings:-

(i) Didelphous

(ii) Diplostemony

(iii) Deciduous calyx:-

(iv) Apocarpous

(v) Tetradynamous

(vi) Pappus

(vii) Spur

c- Compare between each of the followings:-

(i) Legume & siliqua

(ii) Drupe & berry

Best Wishes
Prof. Momen Zareh

- (83) The fruit that develops from hypanthodium inflorescence is called: -
a. follicle b. Sorosis c. Siliqua d. Syconus
- (84) The megasporangium of angiosperms on maturation gives rise to:-
a. fruit b. seed c. embryo d. cotyledon
- (85) The embryo sac of a dicot at the time of fertilization is:-
a. 8-celled b. 4-celled c. 16-celled d. 2-celled
- (86) The seed micropyle helps in the entry of:-
a. pollen tube b. male gametes c. water d. none
- (87) The fusion product of the two polar nuclei and male gamete is :-
a. triple fusion b. secondary nucleu c. zygote d. endospermic nucleus
- (88) When funicle, chalaza & micropyle lie in the same vertical axis, the ovule is called :-
a. Atropous b. Anatropous c. Campylotropus d. Amphitropous
- (89) The endosperm in angiosperms is :-
a. haploid b. diploid c. triploid d. polyploid
- (90) The pollination by wind is called :-
a. entomophilly b. anemophily c. hydrophily d. windophily
- (91) Large sized flowers, colored petals & nectar glands is adapted to:-
a. entomophilly b. anemophily c. hydrophily d. self-pollination
- (92) Perisperm is a diploid (2n) internal food storage tissue originates from:-
a. funicles b. micropyle c. nucellus d. testa
- (93) Endosperm is a food storage tissue and its cells are:-
a. haploid (1n) b. diploid (2n) c. triploid (3n) d. all of the preceding
- (94) The ridge on seed coat that formed from adnate funiculus is called:-
a. Aril b. operculum c. chalaza d. Raphe
- (95) In *Ricinus* seed, the oily reduced aril or outgrowth present near the hilum is:-
a. micropyle b. operculum c. chalaza d. Caruncle
- (96) The slime layer of polysaccharide produced by some seeds upon imbibition is:-
a. waxes b. mucilage c. anthocyanin d. alkaloids
- (97) In bitegmic seeds the testa is derived from:-
a. seed coat b. inner integument c. both integuments d. outer integument
- (98) If the mechanical layer differentiates in the outer integument, the seed is called:-
a. exo- seeds b. tegmic seeds c. testal seeds d. endo-seeds
- (99) Each type (testal or tegmic seeds) has been divided into infra-types called:-
a. exo- & endo b. meso- & endo c. exo- & meso d. exo-, meso- & endo
- (100) In testa, which of the following is outer layer to the others:-
a. epidermis b. waxy cuticle c. nutritive layer d. Pigment layer
- (101) In general, the epidermal cells of seed coat are:-
a. sclereides b. parenchyma c. collenchyma d. soft cells
- (102) In pulses seed, the hypodermis is consists of sclereides known as:-
a. colour cells b. colourless zone c. hourglass d. pigmented zone
- (103) The 6-8 nutritive layers of testa is formed of thin-walled cells is mainly:-
a. fibers b. sclereides c. parenchyma d. collenchyma
- (104) The dark colour of seeds is almost due to:-
a. waxy layer b. thick sclereides c. hourglass layer d. pigmented layer
- (105) In pulses, the outer layer of testa that composed of sclereides known as:-
a. macrosclereides b. malpighian layer c. palisade sclereides d. all of the preceding

- The nature of fruit depends on the type of: -
- fertilization
 - androecium
 - gynoecium
 - pollination
- (61) The seedless fruits are called: -
- endocarpic
 - schizocarpic
 - parthenocarpic
 - noncarpic
- (62) Receptacle becomes fleshy and is edible in the fruits called: -
- fleshy
 - cremocarp
 - false
 - carcerulus
- (63) Fruit with thin epicarp, fleshy mesocarp and hard or stony endocarp is called: -
- pome
 - berry
 - drupe
 - pepo
- (64) The edible portion of mango is: -
- cotyledons
 - epicarp
 - mesocarp
 - endocarp
- (65) Pepo fruit is generally found in: -
- Compositae
 - Gramineae
 - Cucurbitaceae
 - Apiaceae
- (66) Fruit which like berry but seeds are embedded in the pulp is called: -
- pome
 - berry
 - drupe
 - pepo
- (67) Fruit with a single seed and pericarp fused with testa is called: -
- caryopsis
 - achene
 - utricle
 - nut
- (68) The dehiscent fruit that splits open along one suture only is called: -
- legume
 - follicle
 - Silique
 - Silicula
- (69) The dehiscent fruit that splits open along two sutures is called: -
- legume
 - Silicula
 - Silique
 - all the preceding
- (70) Silique fruit is usually found in the family: -
- Asteraceae
 - Apiaceae
 - Brassicaceae
 - Papaveraceae
- (71) The dehiscent fruit that splits open along two sutures, from apex to base: -
- legume
 - follicle
 - Silique
 - none of the preceding
- (72) The dehiscent fruit that splits open along two sutures, from base to apex: -
- legume
 - follicle
 - Silique
 - none of the preceding
- (73) The dehiscent fruit that splits open along more than two sutures is called: -
- legume
 - follicle
 - Silique
 - capsule
- (74) Caryopsis type of fruit is usually found in the family: -
- Compositae
 - Fabaceae
 - Gramineae
 - Apiaceae
- (75) The dehiscent fruit with seed coat is fused with pericarp is called: -
- nut
 - cypsela
 - achene
 - caryopsis
- (76) The fruit that like caryopsis but seed coat not fused with pericarp is: -
- nut
 - cypsela
 - achene
 - caryopsis
- (77) The fruit that like achene but pericarp is winged: -
- samara
 - cypsela
 - achene
 - caryopsis
- (78) The aggregate fruit develops from: -
- single flower
 - inflorescence
 - many flowers
 - united carpels
- (79) Carcerulus type of fruit is usually found in the family: -
- Compositae
 - Leguminosae
 - Gramineae
 - Malvaceae
- (80) Ananas is an example of: -
- sorosis
 - syconus
 - lomentum
 - achene
- (81) The fruit that develops from a whole inflorescence is called: -
- aggregate
 - simple
 - Composite
 - schizocarp
- (82) The fruit that develops from spike or spadix inflorescence is called: -
- follicle
 - Sorosis
 - Silique
 - Syconus

- (38) **Syngenesious stamens are: -**
 a. filaments & anthers free b. filaments united, anthers free
 c. filaments free, anthers united d. filaments & anthers united
- (39) **The arrangement of sepals & petals in bud is known as: -**
 a. placentation b. aestivation c. duration d. modification
- (40) **Which of the following contains the others?**
 a. ovary b. stigma c. carpel d. gynoecium
- (41) **If ovary occupies the topmost position on receptacle, flower is called:**
 a. hypogynous b. perigynous c. epigynous d. Semi-epigynous
- (42) **If the sepals become colored like petals, it is called as:**
 a. sepaloid petals b. petaloid calyx c. tepals d. perianth
- (43) **If sepals become extended into a long beak-like structure, it is called:**
 a. pappus b. spurs c. spines d. bilabiate
- (44) **non-functional stamens are called as:**
 a. staminal tube b. fertile stamen c. staminodes d. none of the preceding
- (45) **stamens arranged in two whorls; outer whorl is opposite the petals:**
 a. isostemonous b. diplostemony c. heterostemonous d. obdiplostemony
- (46) **Unilocular, unicarpellary ovary that has 1 group of ovules placed along the fused margins of the carpel. The placentation should be: -**
 a. axile b. marginal c. parietal d. free central
- (47) **A condition when filaments & anthers are fused is known as: -**
 a. syngenesious b. synandrous c. syncarpels d. adelphous
- (48) **Which of the following is an advanced character?**
 a. Elongated receptacle b. undifferentiated perianth
 c. spiral arrangement d. perigyne
- (49) **Both petals and sepals provided with:-**
 a. endodermis b. abaxial epidermis c. adaxial epidermis d. abaxial & adaxial epidermis
- (50) **Some petals and sepals contain:-**
 a. crystal cells b. hypodermis c. mesophyll d. all the preceding
- (51) **The layer that functions as a source of nutrients for developing pollen grains is:-**
 a. epidermal layer b. tapetum layer c. endothecium d. vasculature layer
- (52) **The layer that contribute to the anther dehiscence mechanism is:-**
 a. epidermis b. endothelial layer c. tapetum layer d. vasculature layer
- (53) **The outer endothelial cells of anther wall typically develop into:-**
 a. fibrous wall b. epidermal cells c. tapetum layer d. testa
- (54) **The innermost layer of cells surrounding the anther locule is called:-**
 a. endodermis b. endothecium c. tapetum d. fibrous wall
- (55) **The ground tissue of the style is composed of:-**
 a. parenchyma b. sclereides c. collenchyma d. fibres
- (56) **The hypodermis of the gynoecium is composed of:-**
 a. parenchyma b. sclereides c. collenchyma d. fibres
- (57) **The two carpellary vascular bundles of the gynoecium wall diverge into:-**
 a. ovules & style b. stigma & style c. ovules & stigma d. all of the preceding
- (58) **In gynoecium wall, the spetal nectary present in:-**
 a. epidermis b. hypodermis c. vascular strands d. between carpels
- (59) **The ventral carpellary trace of the gynoecium wall diverges into:-**
 a. ovules b. stigma c. stigma d. all of the preceding

- When terminal bud continues to grow as a central leader shoot and the lateral branches remain subordinate, the type of branching called:-
 a. monopodial b. axillary c. lateral d. all of the preceding
- (19) When the apical bud is differentiated into a flower and one or more axillary buds grow out, the type of branching called:-
 a. monopodial b. flowering c. apical d. sympodial
- (20) When the stem grows erect and do not produce any branches, the growth pattern is called:-
 a. excurrent b. delequescent c. caudex d. decurrent
- (21) When stems trailing for some distance lift its apex that bears flowers, the growth pattern is called:- stems
 a. trailers b. stolons c. rhizome d. excurrent
- (22) The stems which resemble runners except that they are produced just below soil are:-
 a. trailers b. creeper c. stolons d. prostrate
- (23) The weak stem that clings with the help of thorns is called:-
 a. trailers b. twiners c. thorny d. climber
- (24) The climber stems clings with the help of :-
 a. prickles b. hooks c. thorns d. all of the preceding
- (25) The underground stems differ than roots in the presence of:-
 a. green leaves b. nodes & internodes c. roots d. all of the preceding
- (26) Underground stem that has distinct notches called eyes which represent nodes is:-
 a. stolon b. tuber c. rhizome d. bulb
- (27) The underground stems that are swollen ends of underground branches which store food is:-
 a. stolon b. rhizome c. tuber d. bulb
- (28) The underground stems that have dried scales called tunic for protection, each scale is a modified thick and fleshy leaf:-
 a. sucker b. scaly bulb c. layered bulb d. all of the preceding
- (29) In *Opuntia* the stem is modified into a green flattened structure called:-
 a. phyllostem b. phylloclade c. cladodes d. bulbil
- (30) Some stems modified into spines for:-
 a. protection b. storage c. increase respiration rate d. transduction
- (31) Stems modified into to help in photosynthesis:-
 a. phylloclade b. cladode c. leafy stem d. all of the preceding
- (32) Bulbil is a special multicellular body essentially meant for:-
 a. photosynthesis b. respiration c. transpiration d. reproduction
- (33) Flower that cut into two equal halves along one median longitudinal plane only is called: -
 a. actinomorphic b. zygomorphic c. regular d. asymmetrical
- (34) non-functional stamens are called as:
 a. staminal tube b. fertile stamen c. staminodes d. none of the preceding
- (35) A condition when filaments & anthers are fused is known as :-
 a. syngenesious b. synandrous c. syncarpels d. adelphous
- (36) Persistent calyx is: -
 a. sepals attached to the fruit b. calyx is green, leafy.
 c. calyx become hard & rough d. none of the preceding.
- (37) When the flower is hypogenous, the ovary is called: -
 a. superior b. inferior c. semi-inferior d. semi-superior

Faculty of Science Botany Department	بسم الله الرحمن الرحيم	كلية العلوم قسم النبات
Msc degree of (Plant taxonomy & Flora of Egypt) Principles of Plant Taxonomy B 617		First Semester : Feb. 2023 Date: 15/2/2023 Time allowed : 2 hours

Answer all the following questions :-

The first question:-

Choose the correct answer, put your answer in a table :-

- (1) The regions of the primary stem where leaves and buds arise are called:
a. nodes b. internodes c. leaf primordia d. leaf mother cells
- (2) The stem grows positively:-
a. phototropic b. geotropic c. semitropic d. eutropic
- (3) The principle and adventitious buds developed in the axis are best called:-
a. axillary b. lateral c. subterminal d. adventitious
- (4) The stems in plants that appear to be stemless are known as:-
a. acaulescent b. Pseudostem c. dwarf d. prostrate
- (5) Stem holds flowers, comes out of the ground and has no normal leaves is:-
a. scape b. flowering stem c. sexual stem d. naked stem
- (6) The flattened stem of several internodes functioning as a leaf is known as:-
a. multiclade b. phylloclade c. Cladodes d. nodal clade
- (7) Buds that formed at the end of a growth season and become dormant until the next growth season is called:-
a. summer b. winter c. resting d. dormant
- (8) The buds whose growth has been delayed for many years are called:-
a. summer b. winter c. resting d. dormant
- (9) The summer bud is can also called:-
a. scaly b. naked c. dormant d. leafy
- (10) The arborescent, fruticose and suffrutescent are plant types of:
a. woody b. annual c. herbaceous d. perennial
- (11) Plant woody throughout and large, usually with several main stems is called:-
a. fruticose b. arborescent c. suffrutescent d. herbaceous
- (12) The semi-shrub with stems only woody at the base is called:-
a. fruticose b. arborescent c. suffrutescent d. Shrubby
- (13) If the plant has a stem that die back to the ground each year, it is called:-
a. woody b. arborescent c. Shrubby d. herbaceous
- (14) Annuals, Biennials and Perennials are plant types of:
a. woody b. Shrubby c. herbaceous d. fruticose
- (15) Herbaceous plants that live for 3 years or more are called:-
a. woody b. annuals c. perennials d. biennials
- (16) When the stem is branched into two equal branches, it is called:-
a. axillary b. definite c. apical d. lateral
- (17) When erect stems are unbranched and originate in clusters, growth pattern is called:-
a. excurrent b. delequescent c. culm d. decurrent



Assiut University

Time: 3hour

Faculty of Science MS.C students Code: 604Z

Zoology & Entomology Department

Second Semester Histochemistry Exam (2024/07/04)

Answer the following questions: (50 marks)

Q1-Choose the correct answer for the following items:- (10 Marks)

1- Purines and pyrimidines can be demonstrated by?

- (a) Fluorescence microscope (b) Light microscope
(c) Ultraviolet microscope (d) Electron microscope

2- Deoxyribose sugar can be detected in nucleic acids by ?

- (a) Methylene blue (b) Feulgen reaction
(c) Silver nitrate (d) Acetic acid

3- Which method uses tritiated thymidine and tritiated uracil for the specific demonstration of DNA and RNA?

- (a) Methyl green pyronine method (b) Malachite green and acridine red
(c) Autoradiography (d) Fluorescence microscopy

4- What is necessary to purify methyl green before using it for nucleic acid staining?

- (a) Ethanol extraction (b) Chloroform extraction
(c) Water extraction (d) Acidic pH adjustment.

5-Which enzyme is used for the differential localization of RNA & DNA?

- (a) Ribonuclease (b) Deoxyribonuclease
(c) Hyaluronidase (d) Chondroitinase.

6-Which cellular structure is illustrated using acid phosphatase in enzyme histochemistry?

- (a) Membranes (b) Lysosomes
(c) Mitochondria (d) Microsomes.

- 4- When the copper atoms form a crystal lattice with the density of atoms of $8.5 \times 10^{28} \text{ m}^{-3}$, each atom donates 1 electron in the conduction band. The density of states for the 3-dimensional Fermi gas is:

$$g^{3D}(\epsilon) = \frac{1}{2\pi^2} \left(\frac{2m}{\hbar^2} \right)^{3/2} \epsilon^{1/2}$$

where m is the effective mass of the conduction electrons (assumed to be the free electron mass).

- (a) [5pts] Calculate the Fermi energy and the total energy of all electrons in the conduction band (per unit volume).
(b) [5pts] Calculate the total energy of all electrons in the conduction band (per unit volume).

- 5- A system consisting of three energy levels: $\epsilon_1 = 0$, $\epsilon_2 = 100 k_B$, $\epsilon_3 = 200 k_B$ and $g_1 = 1$, $g_2 = 3$, $g_3 = 5$ at temperature $T=100 \text{ K}$, Calculate:

- a) [4pts] The partition function Z_{sp} .
b) [3pts] Relative population for each level.
c) [3pts] Average energy.

*End of question
Good Luck
Dr. Hadeer El-Hawary*



Answer all the following: (10 Points each)

1- (a) [5pts] Prove that the statistical definition of entropy is compatible with extensive property of entropy.

(b) [5pts] A simple system consisting of six particles $N=6$ and levels given by:

$$\varepsilon_i = i \times 10^{-20} J, \quad i = 0, 1, 2, 3, 4$$

If we can arrange the particles to fulfill the condition that the total energy $U = 4 \times 10^{-20} J$, calculate the number of microscopic states that satisfy these conditions. Find the distribution that reduces the Helmholtz free energy at room temperature (298.1 K).

2- (a) [5pts] For N number of distinguishable Maxwell particles, find that the total partition function for monatomic gases.

(b) [5pts] Prove "Sackur-Tetrode" equation and explain why it is incorrect.

3- Using the following equation, find the distribution function of the Bose-Einstein statistic if the number of cells and particles is large.

$$\Omega_{BE} = \prod_j \frac{(n_j + g_j - 1)!}{n_j! (g_j - 1)!}$$

Hints:

I. $\delta \left(\ln \left(\frac{x+a}{x} \right) \right) = \frac{-a}{x(x+a)}$ and $\delta \left(\ln \left(\frac{x+a}{a} \right) \right) = \frac{1}{(x+a)}$

II. The number of cells and particles is large so put $n_j + g_j - 1 \approx n_j + g_j$ after using Lagrange coefficients equation.



Answer the following questions :

(10 points for each question)

(1-a) Let (E, Γ) be a pretopological space on $E = \{a, b, c, d\}$ and Γ defined by the graph in matrix form as the following: (7 points)

$\uparrow \rightarrow$	a	b	c	d
a	1			1
b	1	1		
c			1	1
d			1	1

and $\Gamma(\phi) = \phi$.

(i) Find $\delta(A_j), \forall A_j \in P(E)$. (ii) Find the open and closed subsets.

(b) Show that the property of being a T_1 -space is hereditary. (3 points)

(2-a) Show that every ordinary set $\Rightarrow$ fuzzy set $\Rightarrow$ intuitionistic fuzzy set but the converse is not true. (5 points)

(b) In intuitionistic fuzzy set A . Define the necessity operation, possibility operation and prove that:

(i) $\square A = \Diamond A$, (ii) $\square(A \cap B) = \square A \cap \square B$ (5 points)

(3-a) Define intuitionistic fuzzy interior $I(A)$, intuitionistic fuzzy closure $C(A)$ and prove that:

(i) $C(A \cup B) = C(A) \cup C(B)$, (ii) $I(A) = C(A)$ (6 points)

(b) Let $E = \{a, b, c\}$ be a set and intuitionistic fuzzy set

$A = \{\langle a, 0.3, 0.6 \rangle, \langle b, 0.5, 0.3 \rangle, \langle c, 0.6, 0.2 \rangle\}$. Calculate $\Diamond A$, $\square A$, $C(A)$ and $I(A)$ (4 points)

(4-a) Let $C = \{\phi, U \subseteq X : U^c \text{ finite}\}$. (i) Show that C is topology on X , (6 points)

(ii) Prove that (X, C) is T_1 -space but not T_2 -space.

(b) Give an example to show that the property of being normal space is not hereditary. (4 points)

(5-a) Let $\Gamma : P(E) \rightarrow P(E)$ be a pretopology on a set $E = \{a, b, c, d\}$ defined by the graph in matrix form as the following: (6 points)

$\uparrow \rightarrow$	a	b	c	d
a	1			1
b	1	1		
c			1	1
d			1	1

and $\Gamma(\phi) = \phi$.

Prove that the pretopology Γ is iston.

(b) Show that the Property of being a regular space is topological property. (4 points)

With best wishes

Prof. Khalaf Abdelhakem & Prof. M. Azab Abd-Allah



Assiut university

Date: 6/2024

Faculty of science

Time allowed: 2 hours

Chemistry department

Final examination of Chromatographic analysis (C644)
For the students of M. Sc. Degree in Organic Chemistry program

Answer the following questions:

(50 Marks)

I) Define the following terms:

(9 Marks)

a. Retardation factor. , b. Electron exchange resins. , c. Gradient elution.

II) Mark (✓) or (X) for *TEN ONLY* of the following sentences and then correct the wrong one:

(10 Marks)

- 1. The anionic exchange resins were defined as polymers containing phenolic, sulfonic, carboxylic, phosphonic acid groups as an integral portion of the resin.
2. The electron-capture detector is particularly sensitive to organic metal compounds, diketone and halogen compounds.
3. Compounds that fluoresce naturally have a conjugated cyclic structure.
4. Flash column chromatography is used for separation of stereo-isomers.
5. The technique of separation of constituents under the influence of electric current by taking advantage of difference in migration rates is called electrophoresis.
6. Column chromatography is a purification technique that is designed for rapid separation by using air pressure.
7. The Cation exchangers have been prepared from cotton by diazotization of adsorbed dyes followed by coupling with polyamines.
8. The separation of the components of a mixture by gel chromatography is based on the differences in the molecular sizes of the components.
- 9. Basis of immunoaffinity chromatography, the sample to be purified is passed through a column containing immobilized antibody.
10. Electrochemical detectors that measure current associated with the oxidation or reduction of solutes are called coulometric detectors.
11. Carbohydrates and polyhydric alcohols can be separated by electrophoresis.

III) Write *NOTES* on *FIVE ONLY* of the following :

(25 Marks)

- 1- Capillary Column. , 2- The difference between FC and CC. , 3- Factors influence the retention time.
- 4- The difference between amperometric and electrochemical detectors.
- 5- Electrophoresis and their instrumentation. , 6- Application of ion exchange resins.

IV) Give reason for the following:

(6 Marks)

- a. Rapid changes from one elution solvents to another in CC are usually avoided.
- b. GC was ineffective for many biochemists.
- c. Refractive index detection can not be used with gradient elution.

Good luck

Prof. Dr. Omima S. Mohamed

Part B (20 Marks)

Answer the following questions.

1-Prove that a dissociative substitution reaction is a first order one and the rate of reaction is independent of the nature of entering group.

2>Show all the expected isomers for the reaction

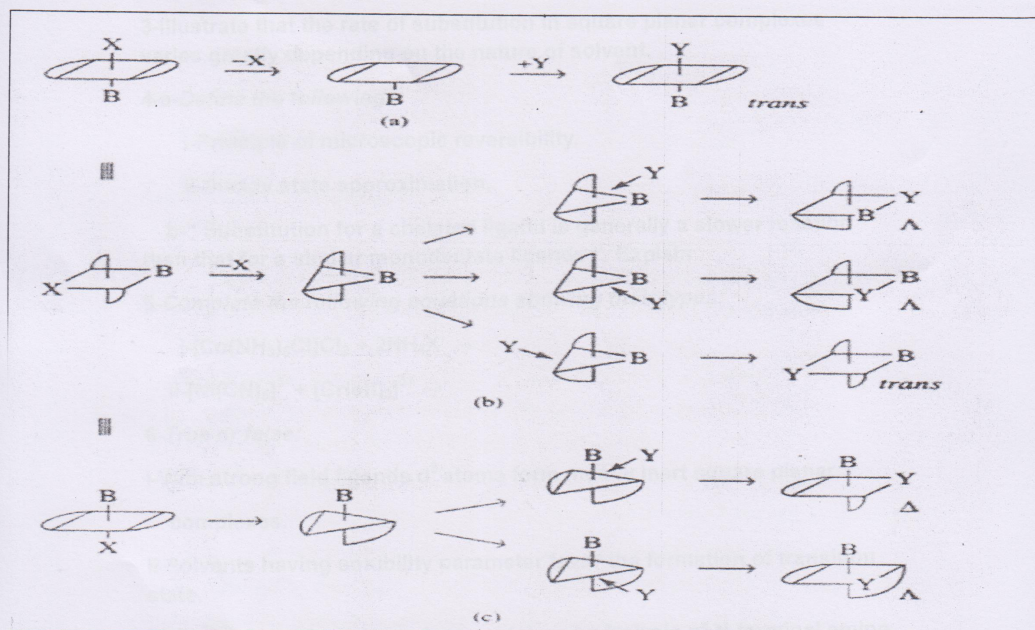


Fig. 1

Part II (25 Marks)

Answer the following questions:

1-Prove that a dissociative substitution reaction is a first order one and the rate of reaction is independent of the nature of entering group.

2-Show all the expected isomers for the reaction:



3-Illustrate that the rate of substitution in square planar complexes varies greatly depending on the nature of solvent.

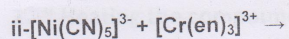
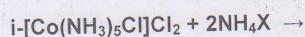
4-a-Define the following:

i-Principle of microscopic reversibility.

ii-Steady state approximation.

b-" Substitution for a chelated ligand is generally a slower reaction than that for a similar monodentate ligands ". Explain

5-Complete the following equations showing their types:



6-True or false:

i-With strong field ligands d^8 atoms form mostly inert square planar complexes.

ii-Solvents having solubility parameter favor the formation of transition state.

iii- Co^{3+} square planar complexes catalyze hydrolysis of N-terminal amino acid from peptides.

iv-Activation energy of the reaction of $[PtNH_3Cl_2L]^+$ with pyridine increase when $L=Cl^-$, Br^- or NO_2^- , respectively.

v-Werner studied cobalt(III) compounds because they are labile and can be readily characterized.

Examiners: Prof. Dr. Aref Aly, Prof. Dr Asmaa Ibrahim

Part II (25 Marks)

Answer the following questions:

1-Prove that a dissociative substitution reaction is a first order one and the rate of reaction is independent of the nature of entering group.

2-Show all the expected isomers for the reaction:

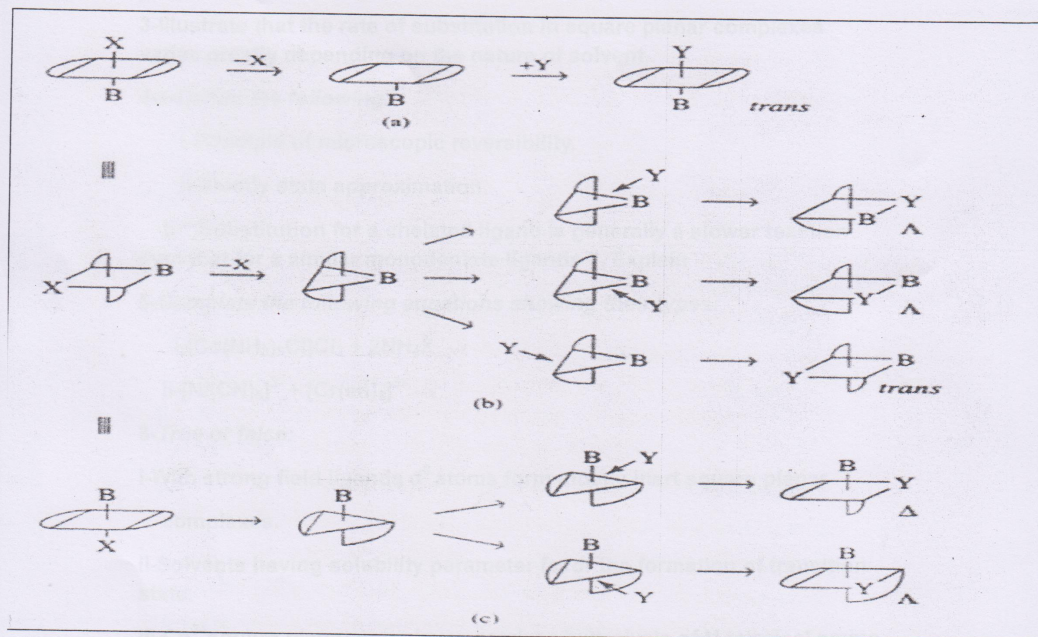
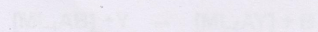


Fig. 1

ii. In outer-sphere complexes that contain ammine complexes

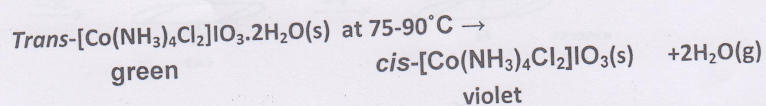
NH_3 provides a good pathway for tunneling.

iii. Inner-sphere reactions resemble those of outer-sphere in

displaying the tunneling phenomenon of electron transfer.

IV. The mechanism for the following isomerization reaction in the solid

state:



indicates that water first replaces Cl^- which then displaced by Cl^- via a pentagonal planar intermediate.

Assiut University

June 2024

Faculty of Science

Time: 3h

Chemistry Department

Final exam of 624 C course " Kinetics and mechanism of inorganic reactions" for M.SC students

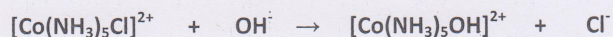
Part I

(25 Marks)

ملحوظة: الامتحان يقع في اربع صفحات

Answer the following questions

1. Fig.1 illustrates the substitution of Y for X in trans $[M(LL)]$ (LL = a bidentate ligand such as en) can proceed in three different ways. Discuss this proposed substitution reaction and the possible resulting cis or trans products. (5 Marks)
2. " Heating the compound $KFe[Cr(CN)_6]$ at $100^\circ C$ produces a change in color as well as in the CN^- bonding mode". Discuss this statement in terms of:
i) Preparation of this complex ii) type of isomerization
iii) confirmation of CN^- flip (change of bonding mode) as deduced from Infrared spectra. (10 Marks)
3. Discuss in details the mechanisms of the following three-step base catalyzed reaction: (6 Marks)



4. Mark the correct sentence with ($\checkmark$) and the false one with ($\times$) (4 Marks)

i. Upon base hydrolysis of Λ -cis- $[Co(en)_2Cl_2]^+$ in dilute sodium hydroxide a change to another configuration occurs.



Chemistry Department



Time allowed: 2hrs

C- 608 Selected Topics in Analytical Chemistry Final Exam

June 2024

Part I: Answer the following questions (25 Marks)

1. Quality control is important for drug analysis- Discuss in detail. (5 Marks)
2. What are the most common biomarkers for breast, prostate, Ovarian, Liver, lung, colon, and melanoma cancers? (5Marks)
3. Discuss the basis for a biosensor device in order to carry out quantitative analysis? (5Marks)
4. Bioelectrochemistry is a modern interdisciplinary field, combines biotechnology and electrochemistry. Discuss this statement. (5Marks)
5. Bioelectrochemical Systems (BESs) are used for many purposes. Give examples. (5Marks)

Part II: Answer the following questions (25 Marks)

1. Give a reason for the following: (7 Marks)
 - a) In conductimetric titrations; the titrant must be concentrated and the titrated solution must be diluted.
 - b) Before carrying polarographic analysis the solution must be aerated by nitrogen gas.
 - c) The sensitivity of square-wave voltammetry is higher than that of differential-pulse voltammetry.
2. What are the types of membrane which selectively interact with the ion to be determined? (3 Marks)
3. What is the difference between alkaline and acid errors that affect pH measurements with glass electrode? (3 Marks)
4. Explain the conductometric titration of strong acid with strong base. (3 Marks)
5. Explain the modes of mass transport to and from the electrode surface. (3 Marks)
6. Explain the factors which influence the conductance of electrolytic solution. (3 Marks)
7. What are the factors contributing to the rate of the electrochemical reaction? (3 Marks)

Good Luck

Prof. Nagwa Abo El-Maali

Dr Tharwat Hassan

- 9- Particle density is defined as the mass of catalyst per unit volume of particle. ()
- 10- The surface area is determined by measuring the amount of gas absorbed in a monolayer. ()

----- Good Luck -----

Prof. Dr. Mostafa Farrag and Dr. Abdelreheem Abdelfatah Saddik

Assiut University
Faculty of Science
Chemistry Department

Date: 24/6/2024
Time: 3 hours

The Final Catalysis and Petrochemistry Examination
for M.Sc. Applied Industrial Chemistry Students (C-691)

I- Answer the following questions:

Q1: State the definition and classification of petrochemicals. Give examples for each classification. (5 Marks)

Q2: Discuss the following: (20 Marks)

A- Low-Density Polyethylene Industry.

B- Nylons Industry.

C- What are the Advantages and Disadvantages of Synthetic Detergents?

D- The major petrochemicals produced from methane.

II- Answer the following questions:

Q1: Answer only five questions of the following questions: (20 Marks)

- 1- Compare between the homogenous and heterogeneous catalysis and give example for each type.
- 2- What are the mechanisms of oxidation of CO over Pt catalysts and the hydrogenation of ethyl acetate over Rh/Sn-SiO₂ catalysts.
- 3- Write short note on i-type, n-type and p-type semiconductors.
- 4- Discuss the role of Brønsted and Lewis centers in catalysis, using the aluminum oxide as catalyst.
- 5- Write the types of promoters that used in preparation of catalysts.
- 6- Write the BET equation and show how can use it in calculation of surface area of a catalyst.

Q2: State which of the following statements are true and which are false (5 Marks)

- 1- The diameter of mesopores in the catalyst is between 2 nm and 50 nm. ()
- 2- In the impregnation process, the active phase are impregnated on a support. ()
- 3- Preparation of catalysts by precipitation method is generally prepared by slow mixing of concentrated solutions of metal salts. ()
- 4- The Langmuir equation for the adsorption isotherm is suitable for physical adsorption because it only applies to monolayer adsorption. ()
- 5- The porous nickel catalyst is prepared from a nickel-aluminum alloy by leaching out almost all the aluminum with a caustic solution. ()
- 6- The object of calcination is not to stabilize the physical, chemical, and catalytic properties of the catalyst. ()
- 7- The phenomenon of capillary condensation provides a method for measuring pore size distribution. ()
- 8- The porosity of a catalyst or support can be determined by measuring the particle density and solid (skeletal) density or the particle and pore volumes. ()



Department of Botany and Microbiology
Faculty of Science, Assiut University.



Final Exam. For the Postgraduate Students (M. Sc.) - June, 2024.
Subject: Aquatic Microbiology (632 B) Maximum Allowed Time: 135 Min.

Answer The Following Questions:-

Q.1: Write a Short Essay on TWO ONLY of the following:- (10 Marks)

- A- Algal toxins with special reference to their types and health impacts. Support your answers by some examples and the producing organisms whenever possible.
- B- Adaptation of aquatic fungi, algae and bacteria for marine ecosystems.
- C- Applications of marine fungi.

Q.2: Give a short account on Three Only of the Following:- (12 Marks)

- A- Water stratification referring to the main physico-chemical features of each layer and the inhabitant microorganisms.
- B- The interrelationships between aquatic fungi with both algae and aquatic invertebrates in aquatic ecosystems.
- C- Fungi as causative agents of fish diseases referring to the types of diseases, causative agent, main clinical signs, predisposing factors and fish defenses whenever possible (Write on only two diseases).
- D- Physiological and Morphological adaptability of both anamorphic and teleomorphic aquatic hyphomycetes (Ingoldian fungi) for aquatic environment.

Q. 3: Discuss Briefly on THREE ONLY of the following:- (12 Marks)

- A- The ecological role of viruses, phytoplanktons and fungi in aquatic ecosystems, particularly in food chain.
- B- Rumen fungi with special attention to its role and exploitation.
- C- What are the algal blooms and its impact in aquatic environment?
- D- Potential counter-adaptations by aquatic fungi for hiding from aquatic invertebrates.

Q.4: Write Briefly on THREE ONLY :- (12 Marks)

- A- Water-borne viral and protozoan diseases.
- B- Concept of Synergism, Mutualism, Commensalism and Allelopathy.
- C- Shiga toxins – Beneficial roles of phytoplanktons in aquatic ecosystem.
- D- Harmful role of phytoplanktons - Interactions of algae with some aquatic animals particularly Spotted Salamanders.
- E- Ways in which phytoplankton have evolved higher surface areas (photic zone).

Q.5: Give only one reason for each the following:- (4 Marks)

- A- The characteristic color of the Red Sea.
- B- Superiority of Aquatic Hyphomycetes rather than terrestrial fungi in aquatic ecosystem.
- C- The palatability and nutritional value of the fungal colonized leaves for aquatic invertebrates.
- D- Predominance and priority of fungi rather than bacteria in aquatic ecosystem.

The Best Wishes

Prof. Abdel-Raouf Khallil



ASSIUT UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF GEOLOGY

POSTGRADUATE M. Sc. PROGRAM IN GEOLOGY

FINAL EXAM,

ORIGIN AND EVOLUTION OF EARTH,

(G 626)

Academic Year 2023-2024, Second Semester, Time allowed 3 Hours, 50 marks

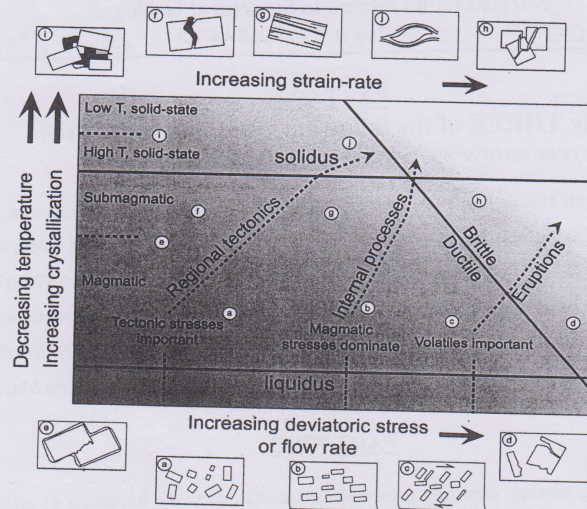
ANSWER THE FOLLOWING QUESTIONS:

- 1- Summarize the major consequences of collision of asteroid on Earth's surface at the K/Pg boundary. (10 Marks)
- 2- Explain the physical and biological factors which controlling the Natural selection. (10 marks)
- 3- Write shortly on the following scientific terms: (10 marks)
(a) Competition (b) Extinction (c) Specification (d) Divergent Evolution
- 4- After studying the paleogeographic maps of the Mesozoic Era, review the tectonic evolution of the Gondwana Land. (10 marks)
- 5- Discriminate between Prokaryotes and Eukaryotes organisms. (10 marks)

Good luck and wishes of success

Nageh A. Obaidalla (Prof. of Stratigraphy)

2- The following schematic diagram showing the complex transition from magmatic to solid state behavior. Write the name of each structures from a to j. (15 Marks)



GOOD LUCK

Prof. Dr. Moustafa M. Youssef
Dr. Hasasan Abbas



كلية العلوم - قسم الجيولوجيا



جامعة أسيوط

امتحان طلاب تمهيدى ماجستير (ساعات معتمدة)
مقرر (G656) موضوعات مختارة من الجيولوجيا التركيبية
Selected topics related to Structural Geology

الزمن : ساعتان

الدرجة الكلية (٥٠ درجة)

يونيه ٢٠٢٤

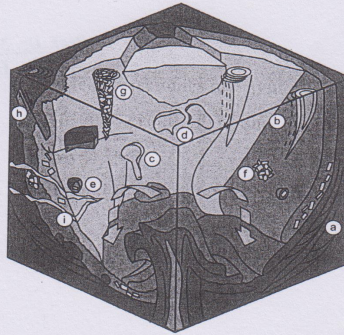
PART ONE

Answer Only **THREE** of the following Questions: (26 Marks)
Illustrate your answer with drawings when possible

- 1- Write on fault trends that affect the Egyptian territory and their influence in shaping the morphology of the country. (9 Marks)
- 2- Give a brief account on Cretaceous tectonics in Egypt (8 Marks).
- 3- Explain the structural style and evolution of one of the inversion structures you studied in the northern Western Desert. (9 Marks)
- 4- Write on the tectonic evolution of the Syrian Arc System in north Sinai. (8 Marks)

PART TWO

- 1- The following cartoon depicting mesoscale magmatic structure formation in an incrementally grown crystallizing magma chamber intruded by new magma pulses. Write the name of the structures from a to i. (9 Marks)



بقية الاسئلة فى الصفحة التالية

Question (III): Answer 5 only briefly for the following:

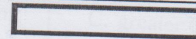
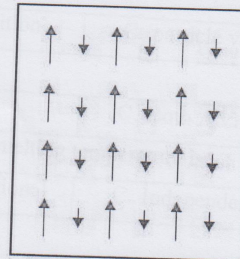
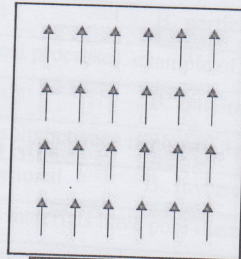
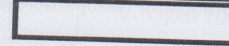
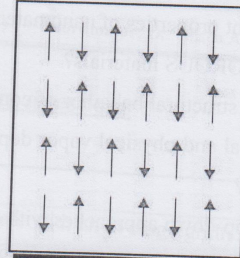
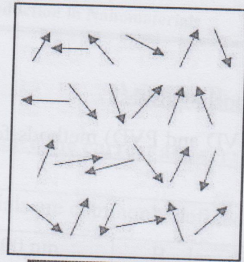
(20 Marks)

1. The size-dependent properties of nanomaterials?
2. MEZO-NANO-POROUS materials?
3. Give in detail the structural behavior of core-shell nanocomposites?
4. Describe Chemical and physical vapor deposition (CVD and PVD) methods for the synthesis of nanomaterials?
5. Bottom-up and top-down approaches with example?
6. Draw synthesis methods for nanoparticles?

Good luck,

Dr. Ghada Abbady

Question (II): Write the scientific definition for the following draw and briefly write the definition of them: (8 marks)



A. Increase	B. Decrease	C. Constant
13- The maximum induced magnetic moment; beyond this field no further increase in magnetization occurs.		
A. saturation magnetization H_{sat}	B. coercivity field H_c	C. residual magnetism field H_r
14- laser ablation one of ----- method.		
A. biological	B. Chemical	C. Physical
15- What is the most characteristic property of Quantum Dots?		
A. Their high photostability	B. Their high quantum yield	C. Their size-dependent color
16- Which of the following is NOT a method of synthesizing Quantum Dots?		
A. Chemical synthesis	B. Plasma synthesis	C. Colloidal synthesis
17- What is one advantage of nanomaterials compared to their bulk-form counterparts?		
A. They have lower porosity	B. They have a smaller size	C. They have fewer specific requirements
18- What is one of the main disadvantages associated with nanomaterials currently?		
A. Inhalation exposure	B. Skin exposure	C. Eye exposure
19- By increasing the temperature, the saturation magnetization, remanence, and the coercive field will be.....		
A. Enhanced	B. Reduced	C. the same
20- The magnetic behavior of materials is contributed to....		
A. the orbital motion of the electron	B. the spin motion of the electron	C. Both A&B
21- what is an example of top-down approaches?		
A. Laser ablation	B. Co-precipitation	C. Sol-gel
22- which of the following materials reveal a hysteresis loop		
A. Ferromagnetic material	B. Ferrimagnetic material	C. Both A&B



Answer the following questions

Question (I): Choice the correct answer:

(22 mark)

1- Nanomaterials are commonly defined as materials with an average grain size.		
A. great than 100 nm	B. less than 100 nm	C. equal 100 nm
2- The behaviour of nanomaterials may depend strongly on.		
A. surface area	B. particle composition	C. particle volume
3- Wet Chemical processes, example of.		
A. top-down only	B. bottom up only	C. Both A&B
4- The relationship between nanoparticle size and melting temperature is.		
A. Direct proportional	B. Inversely proportional	C. Independent
5- Microporous materials have pore diameters.		
A. less than 2 nm	B. between 2 and 50 nm	C. greater than 50 nm
6- The term nanoporous materials have pore diameters.		
A. greater than 50 nm	B. less than 2 nm	C. less than 100 nm
7- Pores which connect to the surface of the material called.		
A. Closed pores	B. Open pores	C. Macroporous
8- Quantum dots occur in.		
A. Three direction	B. Two direction	C. One direction
9- Size of quantum dots.		
A. 1-100 nm	B. 2-10 nm	C. 10-20 nm
10- Quantum dots ----- dimensional.		
A. 0 D	B. 1 D	C. 3 D
11- The field required to reduce the magnetization to zero from saturation.		
A. H_c	B. H_r	C. M_r
12- H_c coercivity field increased with a ----- in grain size .		

4- (a) Define both the correlation coefficient, and the determination coefficient.

(b) The following table shows the heights (in inches) of fathers and their sons:

Father's height	66	65	70	72	67	74	64	58
Son's height	67	68	72	71	71	70	65	60

- Find the regression equation of son's height on father's height.
- Calculate the correlation coefficient (r), and the determination coefficient.
- Estimate the height of a son if his father's height is 68".

5- Four laboratories are being used to perform chemical analysis. Samples of the same material are sent to the laboratories for analysis as part of a study to determine whether or not they give, on the average, the same results. The analytical results for the four laboratories are as follows:

A	58	61	60	59	58
B	62	64	63	59	60
C	55	56	57	55	58
D	60	60	60	61	62

Applying the ANOVA method to test if there are differences among the four treatments, Assuming a 0.05 level of significance.

You may use the following tabulated values

$$\chi^2_{0.005,5} = 0.41, \chi^2_{0.995,5} = 16.75, \quad t_{0.95,7} = 1.9, \quad t_{0.975,4} = 2.8,$$

$$\chi^2_{0.025,4} = 0.48, \chi^2_{0.975,4} = 11.14,$$

$$\Phi(0.5) = P(0 < Z < 0.5) = 0.1915, \quad \Phi(1.5) = P(0 < Z < 1.5) = 0.4332, \quad Z_{0.99} = 2.33, \quad Z_{0.975} = 1.96, \quad Z_{0.995} = 2.58, \quad Z_{0.95} = 1.65, \quad F(0.95,3,16) = 3.2$$

Best wishes

Prof. Dr. Mohamed Adel

Answer the Following Questions:

(10 degrees per question)

- 1- (a) If we know that 0.1 of electronic components produced by some factory are defective, a sample of size 10 is drawn from this production. Find the probability that:
- (i) There are no defectives in this sample,
 - (ii) At most 2 defectives in this sample.
- (b) If the mean height of students of some college is 150 cm, and the standard deviation is 10 cm. Assuming a Normal population; find the probability of students who heights are: (i) between 145 kg and 155 cm, (ii) greater than 165 cm
- 2- (a) Explain what we mean by the terms: The confidence level, and the significance level.
- (b) To find out whether a new serum will arrest leukemia, 9 mice, all with advanced stage of the disease, are selected. Five mice receive the serum and 4 do not. Survival times, in years, are as in the table:

Treated	2.1	5.3	1.4	4.6	0.9
Not treated	1.9	0.5	2.8	3.1	

- (i) Calculate 95% confidence intervals for the mean and the variance of the population of the treated group.
 - (ii) At a 0.05 level of significance, can we conclude that the serum is effective, assuming normal distribution for each group?
- 3- (a) A commonly prescribed drug for relieving nervous tension is believed to be 60% effective. Experimental results with a new drug administered to a random sample of 100 adults who were suffering from nervous tension show that 70 received relief. Is this sufficient evidence to conclude that the new drug is superior to the one commonly prescribed? Use a 0.05 level of significance. Also construct a 90% confidence interval for the population probability p .

(b) A die is tossed 180 times with the following results

X	1	2	3	4	5	6
f	28	36	36	30	27	23

Applying the chi-squared test, can we conclude that the die is balance, assuming a 0.01 level of significance?

2-Describe each of the following with drawing:

30 marks

- a-Classification of enzymes according to formal systemic catalog (International Enzymes Commission (EC) with giving a reaction example for classes 2, 4 and 6.
- b-Microbial species used in production of enzymes in industry and medicine.

3-Explain each of the following with drawing:

25 marks

- a-Application of molecular engineering in improving enzymes activity.
- b-How can the cell enzymes regulate energy and metabolic pathways?

4-Write on each of the following:

25 marks

- a-Role of Microbial enzymes in our lives.
- b-Purification of Microbial enzymes with drawing.

Good luck

Prof. Dr. Hassan A. H. Hasaan

Department of Botany and Microbiology		Final Examination of Microbial Enzymes (631 B)	
Faculty of Science		M. Sc. Students	2023 / 2024
Assiut University		Second Semester	Time: 2 hours

Answer the following questions with drawing (100 marks)

1: Put (✓) for True statements or (X) for False statements and CORRECT THE

FALSE statements:

(20 marks)

1-Lipoxygenase belongs to hydrolases and plays role in bleaching of papers.	()
2- Enzyme cofactors can be mineral salts, or organic molecules as vitamins that can't be synthesized by the organism and must be obtained from the diet.	()
3-A change in the configuration of an enzyme's active site induced by Substrate or Allosteric inhibitors	()
4-In competitive inhibitors: Enzyme can only bind to either substrate or inhibitor at one time and V_{max} changed.	()
5- $\Delta G > 0$ indicates that the reactants have a higher energy level than the products and the reaction doesn't require energy to go from reactants to products.	()
6-In Holoenzyme, the apoenzyme bound to cofactors and the active site is formed by groups of Amino acids but allosteric site is formed by groups of fatty acids.	()
7- In non-competitive inhibitors: Cyanide combines with the SH groups in the enzymes cytochrome oxidase. These can be removed by using ethylene diamine tetracitric acid	()
8- Nanoparticles increased activity of enzymes at size 100 nm	()
9-Enzymes of microbial cell as adenylate kinase and glucose isomerase are located in cytoplasm.	()
10- EC numbers are 4 digits and in Oxidoreductases the digit 3 represents the reaction position.	()

← باقى الاسئلة فى الخلف



Answer the Following Questions: (50 marks; 10 marks per question)

Q1- Define the following terms:

- | | | | |
|-----------------|---|--------------|----------|
| - Ecotoxicology | - Xenobiotic | - LD50/ LC50 | - Hazard |
| - Biomarker | - Bioindicator | - Microcosms | - Urea |
| - Synergism | - Endocrine-disrupting chemicals (EDCs) | | |

Q2- "Amphibians are suffering an unprecedented global decline, and almost half of all amphibian species are at risk of extinction". What causes of this? Explain how soil fertilizers are affecting amphibian.

Q3- "Morphological abnormalities in amphibians may be attributed to environmental contaminants". Explain the morphological abnormalities in *Rhinella arenarum* adults living in artificial fluoride-rich environment.

Q4- Linuron-induced multigenerational effects on amphibian *Xenopus tropicalis* reproduction and metabolism". What is Linuron?, Why *Xenopus tropicalis* is used as a model? Illustrate the effect of linuron exposure on *X tropicalis*.

Q5- "Micro-plastic ingestion can impair wildlife growth and development". Illustrate the effect of micro-plastic on wildlife. Explain the effects of polyester microplastic fiber contamination on Amphibian-Trematode interactions.

==== BEST WISHES ====

Prof. Khaleid Fouad Abd El- Wakeil

K. F. Wakeil



Answer the Three Following Questions and clarify your answer by clear drawings of questions II and III.

QI: Complete the following:

(20 p.)

1. Sensory receptors monitor.....
2. Sensory receptors code or translate..... into.....via.....
3. Proprioception is based onlocated in
4. Special sensory organs are
5. Vomeronasal organ known only in someand it is absent in.....
6. A phylogenetic change occurs in function of the parietal organ.....
7. Golgi tendon organs arethey monitor.....
8. Hair cell is
9. Focusing in fish depends
10. Electoreceptors are responsive to

QII: Compare between the Crista and Macula.

(10 p.)

QIII: Write a clear essay on the main vertebrate photoreceptor.

(20 p.)

"والله ولي التوفيق"

 Assiut University	Course: Final exam of lab and research project (Z654) Year: 2023 - 2024 Time: Two hours Marks: 50	 Faculty of Science
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Answer five ONLY from the following questions

1. Enumerate types of ELISA technique and illustrate one of them.
2. Mention apoptosis phases and how can be detected by TUNEL technology.
3. Write on properties of phosphate buffer and mention the difference between it and PBS.
4. What is the role of RIPA buffer in western blot technique?
5. Define gel electrophoresis and its uses.
6. How do antioxidants respond to oxidative stress?

Good luck

Dr. Hanan Wally

Dr. Sohair Ragab

	Assiut University Faculty of Science Mathematics Dept.	Final Exam 2023/2024 Selected Topics Related to Computer Science Code: MC606	4/7/2024 Level: M.Sc. Time: 3 hours	
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Answer the following questions:

(50 points)

Question 1: (10 points)

- (a) What is the main objective of the research on "Separable reversible data hiding in an encrypted image using the adjacency pixel difference histogram"?
- (b) Mention the problems of reversible data hiding in encrypted images using adaptive Huffman code.

Question 2: (10 points)

- (a) Discuss the advantages and disadvantages of using chaotic maps for applications like cryptography or pseudo-random number generation.
- (b) What is the significance of using the adjacency pixel difference histogram method?

Question 3: (10 points)

- (a) What is the benefit of Deep Convolutional Neural Network (CNN) in image encryption?
- (b) Why is it important to consider lighting and shadow inconsistencies in detecting forged images?

Question 4: (10 points)

- (a) Write about some cryptanalysis techniques.
- (b) Discuss the potential challenges and limitations of using chaotic maps in real-world applications. How can these limitations be addressed through further research or by combining chaotic maps with other techniques.

Question 5: (10 points)

- (a) What is the role of Convolutional Neural Networks (CNNs) in detecting image forgeries?
- (b) In the light of the course, write about a new idea on any topic.

	Assiut University Faculty of Science Mathematics Dept.	Final Exam 2023/2024 Selected Topics Related to Computer Science Code: MC606	4/7/2024 Level: M.Sc. Time: 3 hours	
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Answer the following questions:

(50 points)

Question 1: (10 points)

- (a) What is the main objective of the research on "Separable reversible data hiding in an encrypted image using the adjacency pixel difference histogram"?
- (b) Mention the problems of reversible data hiding in encrypted images using adaptive Huffman code.

Question 2: (10 points)

- (a) Discuss the advantages and disadvantages of using chaotic maps for applications like cryptography or pseudo-random number generation.
- (b) What is the significance of using the adjacency pixel difference histogram method?

Question 3: (10 points)

- (a) What is the benefit of Deep Convolutional Neural Network (CNN) in image encryption?
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Question 5: (10 points)

- (a) What is the role of Convolutional Neural Networks (CNNs) in detecting image forgeries?
- (b) In the light of the course, write about a new idea on any topic.

Assiut university
Faculty of science
Department of zoology



June: 2023
Time: 3 hour
أيه 2614 Physiology Z614

Post graduate examination in zoology (Second term: physiology)

Answer the following questions: (50 Marks: 10 each)

Q1:

1- What are the Causes of iron deficiency anemia and Its Blood picture?

2- Identify anemia? Compare between three of the hemolytic anemia such as causes, the target patients, symptoms and blood picture ? 4 items

Q2:

1- Mention the Causes of megaloblastic anemia?

2- What are the effects of the excess fructose intake? 8 items

Q3: - Write a short account of the following:

1- Function and deficiency of Copper, Vit.B1 and Vit E.

2- Discussion of three types of phase II reactions included in the metabolism of xenobiotics.

Q4

1- Discuss with drawings the mechanism of action of both steroid and non-steroid hormones?

2- Write brief account on the mechanisms of toxicity?

Q5

1- What are the effects of the excess of fructose intake? 6 items.

2- Discuss the main functions of nitric oxide in the body? Mentioning its types with short comment?

With my best wishes and great success,
Professor Dr. Mohamed Bassam Al-Salahy Elbradei

- (c) Sunlight availability (d) both (a&c)

24.have chewing mouthparts.

- (a) flies (b) beetles (c) nemtods (d) both (a&b)

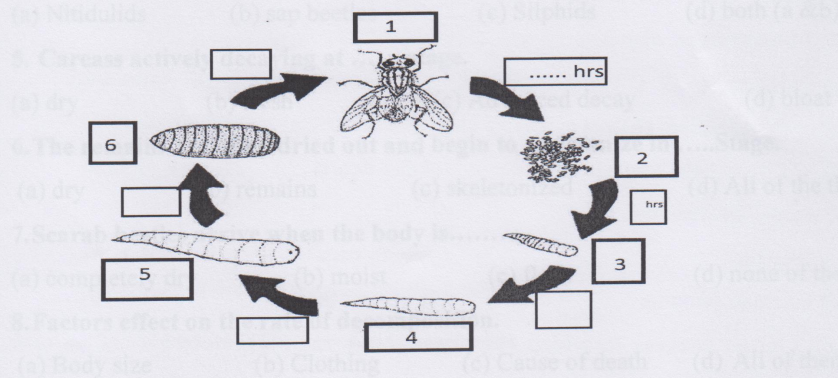
25. The rate of decomposition of human remains can vary due to environmental factors...

- (a) temperature (b) oxygen (c) humidity (d) All of them

II) Explain one of the following: (5 degrees for each)

- Environmental factors effect on decomposition of corpse???
- How Determining the PMI???
- Explain with drawing the difference between incomplete and complete life cycle of forensic insects???
- Explain the Roles of arthropods in ecosystems: benefits for humans??

III) Complete the following: (5 degrees)



End

With best wishes

Dr. Fatma El-Zahraa A. Abd El-Aziz

- (a) Bloated (b) remains (c) Day 2-6 (d) both (a&c)

12. Rove Beetles belong to family.....

- (a) Dermistidae (b) Staphylinidae (c) Cleridae (d) none of them

13. Excretory system of arthropods is characterized by:

- (a) Pinocytes (b) Flame cells (c) Malpighian tubules (d) none of them

14. Clerids are

- (a) Commonly known as checkered beetles (b) The larvae feed on dried fat
(c) Both the larvae and the adults are predatory (d) All of them

15. Forensic science is the application of science to

- (a) Criminal law (b) civil law (c) Consumer law (d) both (a&b)

16. Which of the following are the main characteristic features of arthropods?

- (a) antennae (b) three pairs of legs (c) Pair of wings (d) jointed foot

17. Fused head and thorax called.....

- (a) Abdomen (b) stomach (c) cephalothorax (d) None of them

18. Forensic science, also known as.....

- (a) criminalistics (b) Paleontology (c) Meteorology (d) Astronomy

19. Forensic scientists collect evidence such as

- (a) DNA (b) fingerprints (c) fire debris (d) All of them

20. Carcass beetles are.....

- (a) large beetles (b) with very thick exoskeletons
(c) feed on dried remains (d) All of them

21.is the process in which the organs and complex molecules of animal break down into simple organic matter over time.

- (a) ballistics (b) Decomposition (c) fire debris (d) fingerprints

22. Arthropods are thought to be so very successful because of

- (a) Their small size and Reproductive potential (b) Ecological diversity
(c) Ability to utilize many food sources (d) All of the above

23.will speed up the rate of corpse decomposition.

- (a) Higher temperatures (b) Cooler temperatures



Practical course
2023-2024



Assiut University
Department of Zoology
Faculty of Science

Corse Code: Z630
Time: 2 Hours
Total degree: 50

Answer the following questions: Note : Questions are in 3 pages

I: Choose the correct answer :(25 marks one for each point).

1. The blow fly life cycle has.....parts.

- (a) six (b) ten (c) eight (d) four

2. Which of the following statements is true about spiders?

- (a) Spiders are venomous (b) Spiders have eight legs
(c) Spiders have 2 division in their bodies (d) All of the above

3.cannot expand so arthropods must molt in order to grow.

- (a) exoskeletons (b) eyes (c) antennae (d) intestine

4.are small to minute terrestrial beetles.

- (a) Nitidulids (b) sap beetles (c) Silphids (d) both (a &b)

5. Carcass actively decaying atstage.

- (a) dry (b) fresh (c) Advanced decay (d) bloat

6. The remains are often dried out and begin to skeletonize inStage.

- (a) dry (b) remains (c) skeletonized (d) All of the them

7. Scarab beetles arrive when the body is.....

- (a) completely dry (b) moist (c) flesh (d) none of them

8. Factors effect on the rate of decomposition.

- (a) Body size (b) Clothing (c) Cause of death (d) All of them

9. Breakdown of protein and carbohydrates into simpler compounds.

- (a) Days 10-25 (b) Days 25+ (c) Days 1-2 (d) none of them

10. Remains are skin, cartilage, and bones inStage.

- (a) Post-decay (b) remains (c) fresh (d) bloat

11. Putrefaction begins. Gasses produced by anaerobic bacteria inflate the abdomen

- c) $\begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}$
d) $\begin{pmatrix} i & 1 \\ 0 & -i \end{pmatrix}$
13. What is the matrix representation of the Pauli-Z gate?
- a) $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$
b) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
c) $\begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}$
d) $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$
14. Which Qiskit component is used for visualizing quantum circuits?
- a) Qiskit Execute
b) Qiskit Aer
c) Qiskit Terra
d) Qiskit Draw
15. Which gate in Qiskit creates entanglement between two qubits?
- a) X gate
b) H gate
c) CNOT gate
d) Y gate
16. What does the plot_histogram function in Qiskit do?
- a) Visualizes the results of quantum measurements
b) Creates classical circuits
c) Runs quantum algorithms
d) Assembles quantum circuits
17. In Qiskit, what is the QuantumRegister class used for?
- a) Storing quantum bits
b) Visualizing quantum circuits
c) Simulating quantum circuits
d) Creating machine learning models
18. Which gate in Qiskit is used to create a superposition state?
- a) X gate
b) H gate
c) Z gate
d) Y gate
19. What is the purpose of the ancilla qubit in Qiskit?
- a) To perform measurements
b) To serve as an auxiliary qubit for some operations
c) To simulate noise
d) To visualize quantum states
20. What is the $|+\rangle$ state in quantum computing?
- a) $|0\rangle$
b) $\frac{1}{\sqrt{2}}(|0\rangle + |1\rangle)$
c) $|1\rangle$
d) $\frac{1}{\sqrt{2}}(|0\rangle - |1\rangle)$

With my Best Wishes

- b) X gate
 - c) CX gate
 - d) Z gate
4. What is the $|-\rangle$ state in quantum computing?
- a) $|0\rangle$
 - b) $\frac{1}{\sqrt{2}}(|0\rangle + |1\rangle)$
 - c) $|1\rangle$
 - d) $\frac{1}{\sqrt{2}}(|0\rangle - |1\rangle)$
5. Which of the following conditions is equivalent to $UU^\dagger = 1$ for a complex matrix U ?
- a) U is Hermitian.
 - b) U is unitary.
 - c) U is orthogonal.
 - d) U is normal.
6. How can you apply a CNOT gate to qubit 0 as the control and qubit 1 as the target in Qiskit?
- a) `cnot(0, 1)`
 - b) `cx(0, 1)`
 - c) `control_x(0, 1)`
 - d) `c_x(1, 0)`
7. What is the primary function of the Aer simulator in Qiskit?
- a) Calibrate real quantum hardware.
 - b) Visualize quantum circuits.
 - c) Run quantum algorithms on real devices.
 - d) Simulate quantum circuits on a classical computer.
8. Qiskit programs are written in what programming language?
- a) QASM
 - b) Python
 - c) Both a and b
 - d) Specific quantum hardware language
9. What does the concept of "shots" refer to in a Qiskit simulation?
- a) The number of qubits in the circuit
 - b) The number of times the circuit is simulated
 - c) A specific type of quantum gate
 - d) The probability of measuring a qubit in state 1
10. Which method can be used to measure qubits in a quantum circuit in Qiskit?
- a) `qc.measure(qubit)`
 - b) `qc.measure_all()`
 - c) `qc.measure(qubit, classical_bit)`
 - d) `qc.measure_all(classical_register)`
11. What is Qiskit primarily used for?
- a) Creating and simulating classical circuits
 - b) Developing quantum algorithms and circuits
 - c) Analysing classical data
 - d) Creating graphical user interfaces
12. What is the matrix representation of the Pauli-Y gate?
- a) $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$
 - b) $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
 - c) $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$
 - d) $\begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}$



Assiut University

Physics Department
Final Exam: Computational Physics
For Pre-M. Sc. Degree Students
Teaching Staff: Dr. M. A. Sabet

Date: 1/7/2024

Time: 3 hours



Faculty of Science

Answer All The Following Questions:

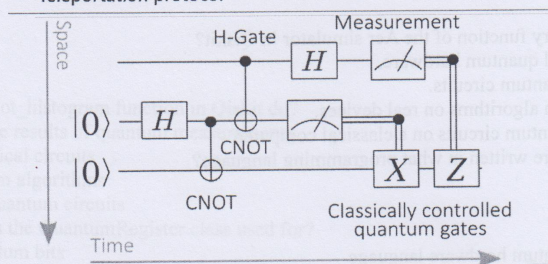
Question 1

- What is Qiskit, and what is it used for?
- What is the difference, importance and matrix representation of these following gates in Qiskit?
 - H- gate
 - X- gate
 - CNOT- gate

Question 2

Write a Qiskit program that can perform the following Teleportation Protocol:

Teleportation protocol



Question 3

- What is a qubit, and how does it differ from a classical bit?
- What is the superposition in the context of quantum computing?
- Write a Qiskit program for this Bell state and represent it by a simple drawing:

$$\frac{1}{\sqrt{2}}(|00\rangle + |11\rangle)$$

Question 4 Choose the correct answer:

- Which of the following statements is true about qubits in Qiskit?
 - A qubit can only be in the state 0 or 1.
 - A qubit can be in a superposition of 0 and 1 states at the same time.
 - Multiple qubits can't be entangled.
 - Qubits are made of light particles.
- How do you create a Quantum Circuit object in Qiskit with 3 qubits?
 - circuit = QuantumCircuit(3)
 - circuit = create_circuit(3)
 - circuit = qiskit.make_circuit(3)
 - circuit = QuantumCircuit() + 3
- What gate applies a bit flip in Qiskit?
 - H gate

e)	Vicki plans to justify her purchase of a \$30 million Gadzooks supercomputer by demonstrating its 16,384 processors can achieve a scaled speedup of 15,000 on a problem of great importance to her employer. What is the maximum fraction of the parallel execution time that can be devoted to inherently sequential operations if her application is to achieve this goal?			
	A. 0.052	B. 0.112	C. 0.084	D. 0.071
f)	Suppose that we are considering developing a parallel program to improve on an existing sequential program and that we determine that 10% of the execution time of the sequential program is spent in inherently sequential code. (We have to inspect the code to determine this.) The remaining code can be parallelized, although we do not as yet know how many processors would be optimal. What is the maximum possible speedup that could be obtained if we were to develop a parallel version that used ten processors?			
	A. 5.26	B. 5.9	C. 10	D. 8.1
g)	For a problem size of interest, 6% of the operations of a parallel program are inside I/O functions executed on a single processor. What is the minimum number of processors needed for the parallel program to exhibit a speedup of 10?			
	A. 20	B. 6	C. 24	D. 10
h)	A parallel program executing on 32 processors spends 5% of its time in sequential code. What is the scaled speedup of this program?			
	A. 30	B. 30.45	C. 29.5	D. 28.1
i)	What is the maximum fraction of a program's parallel execution time spent in serial code to achieve a scaled speedup of 7 on 8 processors?			
	A. 0.7	B. 0.5	C. 0.1	D. 0.14
j)	20% of a program's execution time is spent within inherently sequential code. What is the limit to the speedup achievable by a parallel version of the program?			
	A. 20	B. 10	C. 5	D. 4

End of Exam



	Assiut University Faculty of Computer & Information Computer Science Department	Course Name: High Performance Computing	
		Course ID: MC602 (Faculty of Science)	
		Duration: 3 Hours	
		Date: 1/7/2024	
		Academic Year: 2023-2024	
Semester: ☐ 1 st ☒ 2 nd ☐ Summer			

Final Exam

Answer the following question sets.

Q1

- Define *data parallelism* and *function parallelism* in a data dependence graph. (5 Grades)
- Draw a graph for the **Butterfly Switch Network** with 8 processors. Explain how to route a message from the 2nd processor to the 5th processor. (5 Grades)

Q2

- Describe, in brief, **Processor Arrays**, **Multiprocessors**, and **Multi-computers** architectures. (5 Grades)
- Define the **Cache Coherence Problem**. Discuss how the *directory-based protocol* can resolve this problem. (5 Grades)

Q3

- State the proof of **Amdahl's Law** and **Gustafson-Barsis's Law**. (5 Grades)
- Discuss four distinct paths for developing *applications software* for parallel computers. (5 Grades)

Q4

- State **Foster's Methodology** for designing a parallel algorithm. (5 Grades)
- What is the difference between *local* and *global communications* in a task/channel model? (5 Grades)

Q5. Mark in the answer sheet according to the corresponding numbers the best answer to the following statements. (1 Grade for each)

a)	In a parallel reduction problem, 30 data elements are distributed on 2 parallel processes. How many tasks are in each process before communication?	A. 15	B. 14	C. 20	D. 10
b)	If 25% of the operations on a parallel program must be performed sequentially, what is the maximum speedup available?	A. 3	B. 4	C. 2	D. 5
c)	What is the primary reason for a speedup of only 4.7 on 8 CPUs, if the speedup equals 1.82 when using two parallel machines?	A. A large serial fraction.		B. Communication overhead.	
		C. A large parallel fraction.		D. Imbalanced workload.	
d)	What is the primary reason for a speedup of only 4.7 on 8 CPUs, if the speedup equals 1.87 when using two parallel machines?	A. A large serial fraction.		B. Communication overhead.	
		C. A large parallel fraction.		D. Imbalanced workload.	



- (a) Rewrite the given ODEs using fractional order derivatives of order α , where $0 < \alpha \leq 1$. Explain the meaning of the fractional order derivative in the context of the epidemiological model.
- (b) Find the endemic equilibrium point for the model.
- (c) Analyze the local stability of the endemic equilibrium point.

Question No. 3:

(15 marks)

- The transmission dynamic of disease with subpopulation (compartments) is given by SIS type model as:

$$\frac{dS}{dt} = A - \mu S - \beta SI + \gamma I,$$

$$\frac{dI}{dt} = \beta SI - (\mu + \gamma + \delta)I.$$

The total population N is divided into two compartments with $N = S + I$, where S is the number of individuals in the susceptible class, I is the number of individuals who are infectious.

- (a) Find the equilibrium points for the system.
- (b) Prove that free disease equilibrium is globally asymptotic stable if $R_0 < 1$.
- (c) Prove that the endemic equilibrium is globally asymptotic stable if $R_0 > 1$.

----- End of Questions with my Best Wishes for Success -----



Department of Mathematics
2nd Semester 2024
Date: 1 / 7 / 2024
Marks: 50

Mathematics final exam

Preliminary exam for the Master
of Philosophy in Science,
Mathematics
Time: 3 hours



Selected Topics in Pure Mathematics (M614)

Answer the following questions:

Question No. 1:

(20 marks)

- A time-delayed SEI model is given by the following system of delay differential equations:

$$\frac{dS}{dt} = A - \beta S(t) I(t) - d S(t),$$

$$\frac{dE}{dt} = \beta S(t - \tau) I(t - \tau) - (d + \delta) E(t),$$

$$\frac{dI}{dt} = \delta E(t) - (d + \alpha) I(t),$$

where S represents the number of susceptible individuals, E represents the number of exposed individuals, I represents the number of infected individuals, A is the birth rate, β is the transmission rate, d is the rate of natural death, α is the death rate triggered by disease, δ is the transmission rate from E to I , and τ is the time delay.

- Discuss the role of the exposed (E) compartment in capturing the incubation period and explain the meaning of each equation in the context of the SEI model.
- Explain the significance of the time delay in the model and discuss how it affects disease dynamics.
- Evaluate the basic reproduction number R_0 using next generation matrix method.
- Analyze the local stability of the disease-free equilibrium point and discuss the implications for disease control in the presence of time delay.

Question No. 2:

(15 marks)

- The following ordinary differential equations (ODEs) representing an SI epidemiological model with feedback control:

$$\frac{dS}{dt} = S(r - aS) - bSI - c u S, \quad \frac{dI}{dt} = bSI - \mu I, \quad \frac{du}{dt} = -e u + d S$$

The model assumes that only the susceptible class is capable of reproducing with logistic growth and transmission coefficient b . The parameters b , a , r , and μ are constants and positive values, r measures the rate of recruitment of susceptible persons and μ represents the infectious persons mortality rate. $u(t)$ is a feedback control variable, while c , e and d are feedback control coefficients and all are positive constants.



Assiut University

Faculty of Science

Dept. of Mathematics

Date: Monday 01/07/2024

Exam: M.Sc. 2023/2024

Second Term

Time: 3 hours



Subject: Selected Topics Related to Pure Mathematics (M614)

Answer the following questions: (10 Marks for each question)

Part I

1) Define the following types of solutions of nonlinear partial differential equations (NLPDEs):

(i) Travelling waves (ii) Solitary waves (iii) Solitons (iv) Kink waves (v) Compactons

2) Find the exact solution of the following modified KdV Equation:

$$u_t + 6u^2 u_x + u_{xxx} = 0.$$

Is the obtained solution being solitary wave type and why?

3-a) Explain the main steps of the extended tanh-function method for solving NLPDEs.

3-b) Apply the extended tanh-function method to find solutions of the following KdV-Burgers-Kuramoto equation:

$$u_t + uu_x + u_{xx} + u_{xxx} + u_{xxxx} = 0.$$

Part II

4-a) Find the critical points and draw the trajectories of the following system:

$$\dot{x} = -y, \quad \dot{y} = x \text{ with initial conditions } x(0) = 1, \quad y(0) = \sqrt{3}.$$

4-b) Study the stability of the following systems:

$$\text{i) } \dot{x} = -x + y + (x^2 + y^2), \quad \dot{y} = -2y + (x^2 + y^2)^{\frac{3}{2}}.$$

$$\text{ii) } \ddot{x} + x = 0.$$

5-a) Suppose λ_1, λ_2 are the roots of the characteristic equation of a linear system, state all possible cases for the roots λ_1, λ_2 and the corresponding type of stability.

5-b) Draw the phase portrait of the following system:

$$\dot{x} = -2x + y, \quad \dot{y} = x - 2y.$$

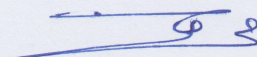
Best wishes
Dr. Ahmed A. Shoreh

- 2 PH is the most important parameter in controlling the size and shape of Au NPs. ()
- 3 The term "quiescent" refers to a dormant parasitic relationship, which after some time changes to an active one. ()
- 4 Only hydrogenase Hyd-1 is responsible for promoting the reduction Pd (II) to Pd(0) nanoparticles using genetically engineered *E. coli*. ()
- 5 Many vegetables have a pH>8 and consequently bacterial rots are much more common in vegetables. ()

Question 3: Give a detailed account on the following (30 marks)

- a) Peptides and proteins in bionanotechnology.
- b) Plant extracts-based synthesis of NPs.
- c) Physical treatments of postharvest diseases.
- d) Antagonists microbes in the control of postharvest diseases.
- e) DNA origami.

With my best wishes
Prof. Dr. Mohamed Hashem



M.Sc. postgraduate students' exam

2nd Semester (2023-2024)

Selected Topics Related to Microbiology (B636)

Time allowed: 2 hours

Score (50 marks)

الاختبار مطبوع على وجهي الورقة

Question 1: Choose the correct answer. (10 marks)

- Proteins are actively involved in the following functions:
(A) Enzymatic reactions (B) Controlled nucleation
(C) Transport of raw materials (D) All of them
- Ions Are functioning as stabilizers of organic structures and information transmitters, and the transition metals, in combination with proteins, as catalysts.
(A) Na^+ and K^+ (B) Mg^{2+} and Ca^{2+}
(C) Sr^{2+} and Ba^{2+} (D) Al^{3+} and Fe^{3+}
- Approaches that could be used to increase the efficiency of bioagents are.....
(A) Apply mixed cultures (B) Addition of high level of fungicides
(C) Addition of GRAS chemical (D) Both A and C
- Which of the elements may occur simultaneously as a structural element and an electrolytic element?
(A) K (B) Na (C) Ca (D) Cl
- What is a main role of nucleic acids in the biological system?
(A) Storage and transfer of genetic information (B) Molecular recognition
(C) Regulation of gene expression and catalysis (D) None of them

Question 2: Label the correct sentence with (√) and wrong one with (X)

(10 marks)

- The amount of seed extracts plays a critical role in controlling the shape, size, and size dispersity of NPs . ()

Assiut University
Faculty of Science
Department of Botany and Microbiology
Special Topics in Microbiology
S2-2023/2024
Time: 2 h
Final Exam , Postgraduate students of Master Degree in Microbiology
.....

Answer 5 questions of the following :

- 1- The actinobacterium *Streptomyces* currently provides many of the world's clinical antibiotics. Write briefly about this statement

(10 Marks)

- 2- Numerous plant and animal pathogens are spread by the aeromicrobiological pathway. Write briefly about this statement and describe an example.

(10 Marks)

- 3- Despite the pathogenicity of some microbes, eubacteria and fungi play major beneficial roles in life. They are the major decomposers in the ecosystems which perform a valuable service as Earth's cleanup crew in addition to other benefits. Write briefly about this statement and outline various roles of microorganisms in the ecosystem dynamics.

(10 Marks)

- 4- Write about the small intestinal bacterial overgrowth.

(10 Marks)

- 5- The infectious microbe is said to be *aerosolized* when an infected individual coughs, sneezes, exhales, or vomits, but can also arise from flushing a toilet, or disturbing dried contaminated feces. Define in terms of time and distance various types of transport of bioaerosols.

(10 Marks)

- 6- Write briefly about *Bacillus anthracis* as a bacterial geo-indigenous pathogen that causes lethal zoonotic disease in humans and animals.

(10 Marks)

Good Luck



Assiut University
Faculty of Science
Botany & Microbiology Department
2nd Semester 2023-2024
Allowable Time: 3 hours

Paper Exam: Isolation and identification of
insect mycopathogens
Course Code: 199 B
Course Title: Special & Advanced
Microbiology



I- Answer ONLY FOUR of the following questions (with drawing if possible):

1. The different methods of Bioassay.
2. Advantages and disadvantages of chemical application.
3. Explain the two categories of the entomopathogenic fungi life cycle.
4. Differentiate among the insect infections by virus, bacteria, and fungi.
5. Write on the advantages of using fungi as biocontrol agents.
6. Give short notes about the different genera and species of the EPF.

II- Identify ONLY FIVE of the following:

1. *Entomophaga*
2. *Conidiobolus* -
3. Mycelium
4. Native
5. Endemic
6. Indigenous
7. Capilliconidia
8. Instar

Good Luck

Khalid A. Hussein, PhD.

16	Syntegon sterilization addresses the requirements of different sizes and types of pharmaceutical containers.	()
17	ADV sterilizes pharmaceutical liquids in open, semi-sealed and fully closed containers.	()
18	SDR autoclaves utilizes the direct inflow of clean steam, which makes it ideally suited for the sterilization of porous and solid equipment.	()
19	For many medical devices, sterilization with ethylene oxide may be the only method that effectively sterilizes and does not damage the devices.	()
20	During food packaging, the sterilization temperatures ranges from 115 to 127 ° C.	()

Question no (2): Discuss four only of the following topics

(30 Mark)

1. Factors affecting on cellulose production process.
2. Benefits of management the agricultural wastes.
3. Compare between aerobic and anaerobic composting.
4. The disadvantages of static piles (Windrow composting).
5. Effect of compost on soil-borne diseases.
6. Types of dry heat sterilization.
7. Sterilization process in food industries.
8. Methods for sterilizing the pharmaceutical products.
9. Advantages and disadvantages of using nanoparticles in sterilization.

WITH MY BEST WISHES

Dr. Ghada Abd-Elmonsef Mahmoud
ghad

Assiut university Faculty of Science Botany & Microbiology department		
Selected topics in microbiology (B636)		
Academic program: M.Sc. (Microbiology)	2 nd Semester 2023-2024	Time allowed :2 hours

Answer the Following Questions

Question no (1): Put true or false in front of each statement and correct the wrong answers (20 marks)

1	If the carbon/nitrogen compost ration is rich on the carbon side, the nitrogen in the compost will be lower.	()
2	Composting reduces the amount of organic waste through recycling.	()
3	PH value of different compost types ranged from 6.3 to 7.8.	()
4	Static pile method of composting requires very low management and fewer equipment's.	()
5	In windrow composting, earthworms are used to decompose the decaying organic matter into compost.	()
6	Optimum composting conditions are obtained with particle sizes ranges from 4 to 7 inches average diameter.	()
7	In anaerobic composting, heat generated accelerates the breakdown of organic matter.	()
8	Phytotoxicity risk is little in aerobic composting than anaerobic ones.	()
9	Compost contains high organic content reach to 90 - 95 %.	()
10	Active phase is the initial stage when thermophilic microorganisms act upon the organic matter and lead to increase in the temperature of the compost pile.	()
11	Disinfection refers to any process that effectively kills or eliminates transmissible agents from a surface, and equipment.	()
12	Dry sterilization is the process of removing microorganisms by applying moisture heat which is appropriate for moisture-sensitive substances.	()
13	Glutaraldehyde is the most common sterilization method, used for 50% of all disposable medical devices.	()
14	Bleach kills many organisms immediately, but for full disinfection, it should be allowed to react for 20 minutes.	()
15	Ethylene oxide is the sterilizing methods commonly used in cosmetic products.	()

Look in the back

Botany and Microbiology Department		Faculty of Science Assiut University
Date: 4/7/2024	Selected topics in Microbiology (B636)	Time: 2h

Q1. Write in details about biotechnological importance of Haloarchaea and Halophilic bacteria (10 marks)

Q2. Write short notes about each of the following: (15 marks)

- Types, metabolism and physiology of symbiotic N_2 fixation
- Importance of Leghemoglobin to the plant
- Biosynthesis of Fats

Q3. Write short notes about each of the following: (25 marks)

- Here are some key points about hormonal responses and gene regulation in plants under salt stress
- Here is an overview of halophyte distribution and examples in Flora of Egypt.
- Here are the main classifications of halophytic plants

*Best
Wishes!*

Dr. Amro

Prof. Dr. Amal W. Daniel

Dr. Ahmed Amro

Q3-Identified the followings:-

(15 Marks)

- 1-Mucoids substances
- 2- Oligosaccharides.
- 3-Post-incubation coupling in enzyme histochemistry.

Q4-Discusses the followings items :-

(15 Marks)

- 1- Importance & precautions in enzyme histochemistry
- 2- Demonstration of lipids.
- 3- Classification of protein based on their function.

Good Luck

DrHanemSaad Abdel-Tawab

7- Esters of fatty acids with long chained alcohols.

- (a) Waxes (b) Paraffins (c) Carotene (d) Vitamin.

8- Which enzyme histochemical reaction method involves the immediate combination of a compound released by the enzyme with diazonium salt to produce a colored azo-dye?

- (a) Self-colored substrate precipitation (B) Simultaneous capture
(c) Post-incubation coupling (d) Diazonium salt effect

9- Oxidases and dehydrogenases are belong to group of enzymes ?

- (a). Hydrolases (b) Transferases
(c) Oxidoreductase (d) Proteolytic enzymes.

10- Kerasin and phrenosin are examples of:

- (a) Cerebrosides (b) Steroids (c) lipid pigments (d) Isoprene

Q2- Put true or False for the following items:- (10 Marks)

1- The basic idea of the Oil soluble dyes method is that the dye is less soluble in fat than in the solvent used.

2- Oligosaccharides are linked to lipids and proteins in the plasma membrane forming glycolipids and glycoproteins.

3- Basophilia is a specific method used for RNA detection.

4- Control sections are not necessary in enzyme histochemistry.

5- Phosphoric acid does not confer basophilia or metachromasia on the nucleic acid molecules at any pH.

6- Enzymes can be localized in fresh tissue using their specific substrates.

7- Fresh frozen section were done by liquid nitrogen or CO₂.

8- Proteins are polymers of nucleotides.

9- Hemoglobin and myoglobin are fibrous proteins.

10- Deoxyribose sugars, are detected by use of PAS technique.



Assiut University

Time: 3hour

Faculty of Science MS.C students Code: 604Z

Zoology & Entomology Department

Second Semester Histochemistry Exam (2024/07/04)

Answer the following questions: (50 marks)

Q1-Choose the correct answer for the following items:- (10 Marks)

1- Purines and pyrimidines can be demonstrated by?

- (a) Fluorescence microscope
- (b) Light microscope
- (c) Ultraviolet microscope
- (d) Electron microscope

2- Deoxyribose sugar can be detected in nucleic acids by ?

- (a) Methylene blue
- (b) Feulgen reaction
- (c) Silver nitrate
- (d) Acetic acid

3- Which method uses tritiated thymidine and tritiated uracil for the specific demonstration of DNA and RNA?

- (a) Methyl green pyronine method
- (b) Malachite green and acridine red
- (c) Autoradiography
- (d) Fluorescence microscopy

4- What is necessary to purify methyl green before using it for nucleic acid staining?

- (a) Ethanol extraction
- (b) Chloroform extraction
- (c) Water extraction
- (d) Acidic pH adjustment.

5-Which enzyme is used for the differential localization of RNA & DNA?

- (a) Ribonuclease
- (b) Deoxyribonuclease
- (c) Hyaluronidase
- (d) Chondroitinase.

6-Which cellular structure is illustrated using acid phosphatase in enzyme histochemistry?

- (a) Membranes
- (b) Lysosomes
- (c) Mitochondria
- (d) Microsomes.