

Assiut University	Faculty of Science	Year 2
Faculty of Commerce	Applied Industrial Chemistry	Number of pages
Business Administration	Subject: Communication Skills	(6)
Department	Date: 5/ 7/ 2021	Duration: 2 hours

PART ONE: FINAL EXAM (50 Marks)

Question One: Indicate the Scientific Term that reflects each of the following statements: (20 Marks)

1. A style of reading which is done for searching information through a list of numbers or addresses.
2. Communication between individuals and groups which does not follow the officially recognized channel.
3. The transfer of information and understanding from one person to another.
4. A type of intra-communication that a person makes with himself / herself.
5. Communication within an organizational context.
6. Deep-seated beliefs that may make it difficult for the listener to listen to ideas against his beliefs.
7. The path through which the information is transmitted.
8. They are more issue or event focused types of interaction.
9. Communication that takes the form of gestures, body language, facial expressions, and symbols.
10. A level of listening where the listener gives full attention to what is being said.

Question Two: Indicate whether each of the following statements is TRUE (T) or FALSE (F): (20 Marks)

1. Gossip is an informal type of conversation that is often followed by proper discussion, negotiations, and other formal discourse.
2. Communication may be intentional or unintentional.
3. In order to improve your reading skills, you should underline your main points, and take notes.
4. Formal communication must always be written.
5. The start finish technique of reading involves reading the first sentence of each paragraph.
6. Communication that involves exchanging messages through spoken words is called non-verbal communication.
7. To improve your listening abilities, you should look for meaning and consistency in both verbal and non-verbal messages.
8. Informal communication is a type of communication not governed by strict forms and rules.
9. Listening is a type of intra-communication.
10. Reading can be made more effective by working on enhancing the speed of reading only.

Question Three: Choose the Best Answer from the choices provided for each statement: (10 Marks)

1. A reading approach that is required for an in-depth analysis and understanding of the material, is:
(a)Fast reading (b)Skimming (c)Slow reading (d)Scanning
2. Reports and instruction cards are forms of communication.
(a)Oral (b)Verbal (c)Non-verbal (d)Written
3. All of the following are characteristics of informal communication, EXCEPT:
(a)It is restricted by hierarchy or position
(b)Conversations are unarranged
(c)High speed of data and knowledge dissemination.
(d)It benefits from technological advancements.
4. Communication by using language is called:
(a)Written (b)Oral (c)Verbal (d)Non-verbal
5. A type of listening that involves attaching meaning to what is being listened to, is called:
(a)Intuitive (b)Discriminative (c)Comprehension (d)Evaluative

PART TWO: MID-TERM EXAM (20 Marks)

Question One: Indicate the Scientific Term that reflects each of the following statements: (14 Marks)

1. The process of analyzing sounds, organizing them into patterns, interpreting, and understanding message by inferring meaning.
2. The interchange of thoughts, opinions, or information by speech, writing, or signs.
3. Formal communication often involves dialogue with colleagues, friends, and family members.
4. A level of listening where the listener may appear to be listening but actually he is more occupied with his own thoughts.
5. Putting yourself in the speaker's shoes.
6. Listening is a physiological process which involves receiving sound waves by the ear and transferring them to the brain.
7. Passive listening is the most desirable level of listening.

Question Two: Indicate whether each of the following statements is TRUE (T) or FALSE (F): (6 Marks)

1. Survey is a pre-reading step where the reader scans the title, headings and abstract before the actual reading.
2. Effective listening involves efforts from the part of the listener only.
3. Passive listening is the most desirable level of listening.

PART THREE: ACTIVITY & QUIZ & ORAL (30 Marks)

Question One: Indicate the Scientific Term that reflects each of the following statements: (2 Marks)

1. The interchange of thought or information between two or more persons to bring about mutual understanding.

Question Two: Indicate whether each of the following statements is TRUE (T) or FALSE (F): (18 Marks)

1. In the selective listening, listening is done partly.
2. Scanning is a style of reading which is done when one wants to identify the core / main idea of the material.
3. The purpose of communication is to inform or express a certain point of view.
4. Preparation is simply restating what another person said in your own words.
5. Formal communication gives an opportunity to form social groups, and enables people to express their fears.
6. The speaker's accent and speech disorders are referred to as "impatience".
7. Oral communication may take place through face to face communication, or electronic devices.
8. Pleasure and enjoyment are considered one of the purposes of reading.
9. Informal communication can be verbal or non-verbal.

Question Three: Choose the Best Answer from the choices provided for each statement: (10 Marks)

1. Noise and frequent interruptions are among the barriers to effective listening:

- (a) Impairment (b) Physical (c) Psychological (d) Health

2. All of the following are characteristics of communication, EXCEPT:

- (a) It is systemic (b) It is a one-way process (c) It is dynamic (d) It involves at least two persons

3. The final step of the reading process is:

- (a) Recall (b) Read (c) Survey (d) Review

4. The first step of the listening process is:

- (a) Hearing (b) Comprehending (c) Responding (d) Filtering

5. A type of listening that involves paying attention to the spoken words rather than the understanding the heart of the message, is called:

- (a) Attentive (b) Pretending (c) Intuitive (d) Evaluative

BEST WISHES

Dr / Jakline Emile Alfy

Physical Chemistry Examination for 2nd year students
(Industry group) (C/220)

Answer the following Questions:

A) Final Examination

(50 Marks)

1-Derive the following relations:

- a) Enthalpy and internal energy changes
- b) Heat capacity at constant volume and that at constant pressure

2- Give the relation between the enthalpy of a reaction and the heat of formations of its reactants and products.

3- If the heat of combustion of methane and heat of formation of carbon dioxide and water are : -191.77, -94.05 and -57.8 Kcals respectively compute the heat of formation of methane.

4- Choose the correct answer:

- a) Temperature of a system decreases in
 - i) Isothermal expansion ii) adiabatic compression
 - iii) Isothermal compression iv) adiabatic expansion
- b) Two moles of CO and one mole of O₂ are burned in closed vessel. The relation between ΔH and ΔE is
 - i) $\Delta H > \Delta E$ ii) $\Delta E > \Delta H$ iii) $\Delta H = \Delta E$
- c) In the reaction : $H_2 + I_2 = 2HI$ $\Delta H = 12.4$ Kcal.
The heat of formation of HI is
 - i) 12.4 ii) -12.0 iii) 6.2 iv) -6.2 kcal.
- d) The work done in constant volume process is
 - i) Positive ii) negative iii) zero iv) constant
- e) The internal energy change in isothermal process :
 - i) Increases ii) decreases iii) zero iv) constant
- f) The temperature in adiabatic expansion process
 - i) Increases ii) decreases iii) zero iv) constant

A) Mid – Term Examination

(40 Marks)

1) Write the proper equation for calculating ΔE , ΔH , q and w for the following process

a) isothermal b) constant volume c) constant pressure d) adiabatic

2) Give the following relations

a) enthalpy and temperature of a reaction

b) efficiency of heat engine and its working temperatures

c) pressure and volume in an adiabatic process.

3) Calculate the heat of combustion of carbon to carbon monoxide if the heat of combustion of carbon to carbon dioxide and heat of formation of water are -94.05 and -57.8 kcal respectively

4) Define the following

a) molar heat capacity

b) standard heat of formation of a compound

c) isothermal process

d) adiabatic process.



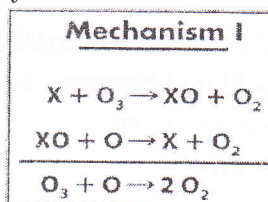
Final Exam of Green Chemistry (214C) for the 2nd Level Students

Part I: - Choose the correct answer for all of the following? (50 Marks)

يتم طمس (تسويد) الأجوبة المختارة من قبل الطالب باستخدام القلم الجاف فقط في نموذج الأجوبة الخاص بالطالب

The answer chosen by the student is blurred (blackened) with the ballpoint pen only in his answer form (Bubble Sheet)

1- The following mechanism represents the catalytic processes contributing to ozone destruction by ---.



- a) hydroxyl free radical as a catalyst
- b) nitric Oxide as a catalyst
- c) inactive form of chlorine
- d) free radicals are readily converted into stable forms

3- In the formation of nitrogen oxides, the reaction proceeds when the temperature ---.



- a) is sufficiently high as in combustion
- b) is decreased
- c) to drive the reaction to the left
- d) is low with +Ve of ΔG are favored

5- Which of the following equations represent the hydrogen abstractions of the hydroxyl radical?

- a) $\cdot CH_4 + HO\cdot \rightarrow H_3C\cdot + H_2O$
- b) $CO + HO\cdot \rightarrow CO_2 + H$
- c) $NH_3 + HO\cdot \rightarrow H_2N\cdot + H_2O$
- d) a & c

7- Which of the following is responsible for the hole in the ozone layer over antarctic?

- a) Carbon dioxide
- b) Compounds containing chlorine
- c) Compounds containing sulfur
- d) Radioactivity

2- Green synthetic methodologies should be designed to use and generate substances that possess ---.

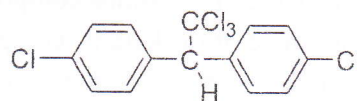
- a) more toxicity to human health and the environment
- b) requirement toxicity to human health and the environment
- c) little or no toxicity to human health and the environment
- d) preserve toxicity to human health and the environment

4- Choose the most likely statement indicated from the following equations?



- a) Synthesis of carbon dioxide
- b) Chlorine reacts with ozone
- c) Revolution of chlorine
- d) Inactivation process of chlorine

6- Choose the name for the following insecticide structure?



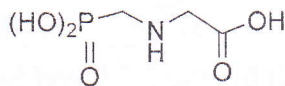
- a) *p,p'*-Dichlorodiphenyltrichloroethane
- b) 5-chloro-2-(2,4-dichlorophenoxy)-phenol
- c) Polychlorinated biphenyls
- d) Dichlorodiphenyldichloroethene

8- Reaction of maleic anhydride with butadiene gave ---.

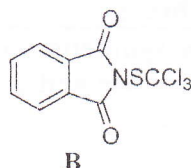
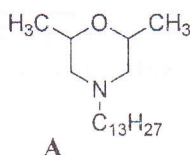
- a) Benomyl
- b) Ethirimol
- c) Captan
- d) Prochloraz

9- Glyphosate herbicide shown below is derived from ---.

- a) glycine
- b) alanine
- c) acetic acid
- d) sulphuric acid



11- Select the correct names for the following compounds?



- a) A. Folpet, B. Triemorph
- b) A. Triemorph, B. Folpet
- c) A. Carboxin, B. Triemorph
- d) A. Oxicarboxin, B. Carboxin

13- Environmental benefits of green chemistry include?

- a) Fewer raw materials and natural resources used
- b) Cleaner production technologies & reduced emissions
- c) Smaller quantities of hazardous waste to be treated and disposed of
- d) All of the above

15- Cashew nut shell liquid CNSL, have a very good friction properties and ---.

- a) it is a rich source of the phenolic compound
- b) it is a rich source of the amine compound
- c) it is a rich source of the ketonic compound
- d) it is a rich source of the acetylenic compound

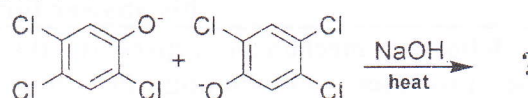
17- Photochemical smog is formed by combination of nitrogen oxide and ---.

- a) hydrocarbons
- b) smoke
- c) fog
- d) SO₂

10- Identify one of the following is not amongst the components of photochemical smog?

- a) O₃
- b) SO₂
- c) Unsaturated hydrocarbon
- d) NO₂

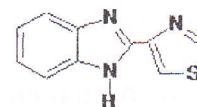
12- What is the product from the following reaction?



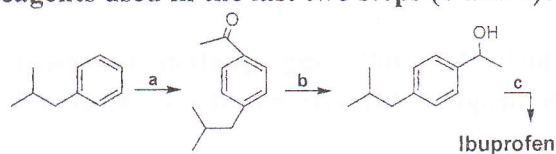
- a) Octachlorodibenzo-*p*-dioxin (OCDD)
- b) 2,3,7,8-tetrachlorodibenzo-*p* - dioxin
- c) trichlorophenoxy anions
- d) pentachlorophenol

14- Choose the correct name for the following structure?

- a) Dimethirimol
- b) Benomyl
- c) Thiabendazole
- d) pyrimidines



16- For the given scheme, choice the best reagents used in the last two steps (b and c)?



- a) b: H₂/Catalyst, c: CO/Pd-Cat.
- b) b: CO/Pd-Catalyst, c: H₂/Cat.
- c) b: Ac₂O/HF, c: H₂/Cat.
- d) b: CO/Pd-Catalyst, c: Ac₂O/HF

18- The major effect of increasing CO₂ in air is ---.

- a) cooling
- b) increasing pollution
- c) heating
- d) none of above

19- Among aerosols distribution modes, the accumulation mode explored as?

- Small particles (0.01 μm) are formed by the condensation of vapors of pollutants
- Small particles (0.02 μm) are formed by the condensation of liquids of pollutants
- Small particles (0.01 μm) are formed by the precipitation of vapors of pollutants
- Small particles (0.1 μm) undergo coagulation followed by deposition of gas molecules.

21- What is meant by Haze?

- Are the particles whose diameter is about that of wavelength of visible light?
- Are the particles whose diameter is higher than that of wavelength of visible light?
- Are the particles whose diameter is lower than that of wavelength of visible light?
- Are the particles whose diameter is about that of wavelength of infra red region?

23-The following equations refer to ---.



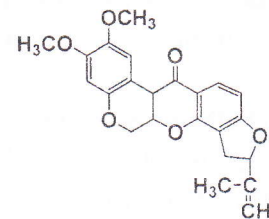
- abstraction of H atom by O_2 from nonperoxy radicals
- if there is no suitable hydrogen atom for O_2 to abstract it will be added
- radicals reaction with O_2 to produce hydroxy radicals
- gases that undergo decomposition by absorbing UV can generate free radicals

25- A part of atmosphere from where ozone depletion process occurred is known as ---.

- biosphere
- ozone layer
- ozone hole
- ozone rich layer

20- Choose the category for the rotenone insectide?

- Carbamate Insectides
- Botanical insecticides
- Organophosphate Insectides
- None of the above



22- Region between 20 - 40 Km above earth's surface is ---.

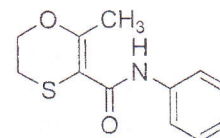
- atmosphere
- biosphere
- environment
- ozonosphere

24- Define the cloud condensation nuclei (CCN)?

- Particles that can become activated to grow to fog or cloud droplets in the presence of a supersaturating of water vapor
- Particles that can become deactivated to fog or cloud droplets in the presence of a supersaturating of water vapor
- Particles that can become activated to grow to fog or cloud droplets in the presence of a supersaturating of sulphur dioxide gas
- Particles that can become activated to grow to fog or cloud droplets in the presence of a supersaturating of nitrogen dioxide gas

26- The following fungicide is belongs to --- family.

- morpholines
- acylalanines
- 1,4-oxathiins
- benzimidazoles



27- Best method for preparing adipic acid from benzene without changing the number of carbon atoms in the chain is ---.

- Draths-Frost Biotechnological Synthesis
- $\text{H}_2/\text{Ni}-\text{Al}_2\text{O}_3/800 \text{ Psi}$, (ii) $\text{CoO}_2/140 \text{ Psi}$, (iii) HNO_3/Heat
- hydrolysis of starch
- fermentation of glucose

29- Which is the most preferred solvent used in drugs industry?

- Benzene
- Cyclohexane
- Dichloromethane
- Ethanol

31- O_2 is converted into O_3 by absorption of---

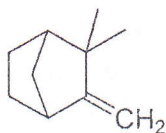
- Cosmic rays
- UV light
- Sun light
- IR radiations

33- The microbial degradation of DDT is fairly well understood which gave the final degrade structure of ---.

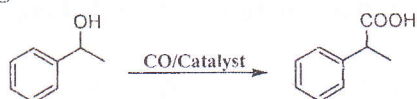
- 1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane
- 4-chlorobenzaldehyde
- Dichlorodiphenyldichloroethene
- Chlorophenyl acetate

35- Choose the correct name for the following insecticide?

- Parathion
- Benzimidazoles
- Toxaphene
- Carbaryl



37- Pick out the atom economy value for the following reaction?



- % atom economy = 42
- % atom economy = 88
- % atom economy = 100
- % atom economy = 50

28- What is the persistent organic pollutant (POPs)?

- Organics that are resistant to environmental degradation processes
- Organics that are response to environmental degradation processes
- Organics that are resistant to environmental pollution processes
- Inorganic compounds that could underwent environmental degradation processes

30- Rain, mist and fog in airborne are considered as ---.

- coarse particles
- fine particles
- PM10
- chemical reactions between gases

32- ----- are used in refrigeration and air conditioning.

- CFC's
- CH_4
- Ozone
- Hydrocarbons

34- What is the following equation refers to?



- Hydroxyl radicals add to CO_2
- Hydroxyl radicals add to SO_2
- Hydroxyl radicals add to CO
- Ionic addition of hydroxyl radicals

36- Which of the following is the more loosely bound to oxygen atoms?

- $\text{BrO} \cdot$
- O_3
- $\text{NO} \cdot$
- $\text{HOO} \cdot$

38- In the second step of Dow process for synthesis of 2, 4-D., a 50% molar excess of 2,4-dichlorophenol in order to ---.

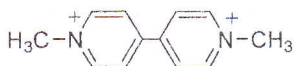
- minimize formation of $\text{HSCH}_2\text{CO}_2\text{H}$
- maximize formation of $\text{HOCH}_2\text{CO}_2\text{Na}$
- minimize formation of $\text{HOCH}_2\text{CO}_2\text{H}$
- maximize formation of $\text{HOCH}_2\text{CH}_2\text{OH}$

39- Benzene is a ---- substance, and is an important industrial solvent used in the production of pharmaceuticals, plastics, and dyes?

- a) odorless
- b) non-flammable
- c) biodegradable
- d) carcinogenic

41- Select the correct name for the following herbicide?

- a) Rimsulfuron
- b) Trifluralin
- c) Paraquat
- d) Diquat



43- Starting with $(\text{CH}_3)_2\text{NH}$, which of the following reagents used for the synthesis of dithiocarbamate fungicides?

- a) a: reduction, b: CS_2
- b) a: CS_2 , b: oxidation
- c) a: oxidation, b: CS_2
- d) None of the above

45- As the sunlight becomes more intense later in the day, --- is broken down and increasing concentrations of ozone.

- a) NO_2
- b) NO
- c) O_3
- d) O_2

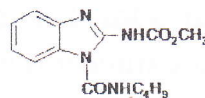
47- Chemical disposal methods of PCBs includes ---.

- a) aromatic nucleophilic substitution
- b) chlorine substitution by poly(ethylene glycols)
- c) reaction with highly electropositive metals
- d) all of a, b, c

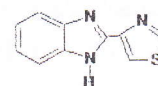
49- Which of the following statements is false regarding hydroxyl radical?

- a) It adding itself to CO
- b) It able to abstract hydrogen atom
- c) It is the rarely oxidizing species
- d) It not reacts by adding itself to CO_2

40- Pick out the correct names for the shown structures?



A



B

- a) A. Thiabendazole; B. Dimethirimol
- b) A. Dimethirimol; B. Thiabendazole
- c) A. Thiabendazole; B. Benomyl
- d) A. Benomyl; B. Thiabendazole

42- Which of the following is the best product form reaction of two moles of sodium 2,4,5-trichlorophenolate?

- a) Tebuthiuron
- b) Glyphosate
- c) Tetrachlorodioxin
- d) Phenoxyalkane carboxylic acids

44- The most important reactive intermediate of daytime atmospheric phenomena is ---.

- a) $\text{HO}^\bullet$
- b) $\text{HOO}^\bullet$
- c) $\text{H}_3\text{C}^\bullet$
- d) $\text{O}^\bullet$

46- Ultraviolet light at the wavelength 220-320 nm range is filtered from sunlight mainly by ---.

- a) O_2 molecules
- b) O_3 molecules
- c) NO molecules
- d) SO_2 molecules

48- Contact herbicides destroy only the --- in contact with the chemical.

- a) roots or tubers
- b) plant leaves
- c) plant tissue
- d) None of all above

50- Nuclei mode is small particles with distribution peak ---.

- a) around $1\mu\text{m}$
- b) around $0.01\mu\text{m}$
- c) around $0.1\mu\text{m}$
- d) None of the above

Part II: - Answer the following with either (✓ or T) or (× or F)? (50 Marks)

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

يتم طمس (تسويد) الأجوبة المختارة من قبل الطالب باستخدام القلم الجاف فقط في نموذج الأجوبة الخاص بالطالب

The answer chosen by the student is blurred (blackened) with the ballpoint pen only in his answer form (Bubble Sheet)

1. Polylactic acid (PLA) is a polymer used for manufacture of plastics products, and prepared from fermentation of disaccharides.
2. Synthetic methods should be conducted at ambient temperature and pressure.
3. A raw material feedstock should be renewable rather than depleting whenever technically and economically practical.
4. Pesticide defined as "any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any gas".
5. Oxidation of SO_2 in aqueous phase is performed by trace amounts of H_2O_2 and O_3 .
6. The O_3 gas that lies above the stratosphere is responsible for filtering most of the UV-light from 120 - 220 nm, from sunlight.
7. Dobson Unit (DU) is the number of O_3 molecules that would be required to create a layer of O_3 , with 0.01 millimeters thick at a 0°C and 1 atm.
8. Troposphere layer which is just up to 6.4 Km above the earth.
9. Bipyridyls is a non-selective and tend to kill off all vegetation.
10. Chemical products should be designed so that at the end of their function they do not persist in the environment.
11. Nearly 75% of the ozone depletion in the antartic occurs by $\text{Cl}^\bullet$ -catalyst mechanism.
12. Troposphere oxidation of methane to formaldehyde is initiated by slow oxidation by hydroxyl radical
13. Catalytic synthesis of Ibuprofen (Winner 1997) is included three steps, in overall 97% yield.
14. H_2SO_3 is responsible for acid rain.
15. Cloud Condensation Nuclei (CCN), are particles that can become inactive to grow to fog in the presence of a supersaturating of water vapor.
16. Dithiocarbamates were the first purely organic insecticides.
17. Inactive compounds, e. g. ClONO_2 , they hold chlorine in an inactive form and can not release to an active form.
18. Systemic fungicides are applied to the surface of the plant, prior to fungal attack.
19. Polychlorinated biphenyls (PCBs) are a class of organic compounds with 1 to 10 chlorine atoms attached to biphenyl ($\text{C}_{12}\text{H}_{10-x}\text{Cl}_x$).
20. Cyanuric chloride is an intermediate in the production of Diquat and Paraquat.
21. In the photochemical smog mechanism, hydrocarbons $\text{RCH}=\text{CHR}$ react with hydroxyl radical by addition resulted in the formation of carbon centered radical.
22. Most dangerous (CO gas) pollutant emitted in air during incomplete combustion of fuels.
23. Paul Crutzen theory demonstrates that the CFC-gases are the main responsible for the ozone depletion.

-
24. Dow process used for synthesis of 2,4-dichlorophenoxyacetic acid (2,4-D) and 2-methyl-4-chlorophenoxyacetic acid (MCPA).
 25. Upper portion of troposphere is known as stratosphere.
 26. Oxidation of SO_2 in gas phase is performed by addition of $\text{OH}^\bullet$ to SO_2 , followed by the formation of SO_4^{2-} .
 27. The chemistry of ozone depletion and other processes in the stratosphere is driven by energy associated with sunlight.
 28. One molecule of chlorine can degrade around 1000 molecules of ozone.
 29. Furans may be formed by strong heating of polychlorinated biphenyl (PCBs) at at 250-450 °C, in the presence of oxygen.
 30. Hydrogen abstraction reactions dominate chemistry in both stratosphere and troposphere.
 31. Thiram is belonging to dithiocarbamates fungicides.
 32. Saprophytic fungi live on decaying matter and largely responsible for the breakdown of animal and plant remains in soil.
 33. The first listed of the 12 principles of Green Chemistry is preventing waste.
 34. The release of chemicals CO , SO_2 and CFCs into the atmosphere causes air pollution.
 35. HNO_2 accumulates only in the night.
 36. Herbicides are chemicals used to control unwanted pest.
 37. The name abbreviation of (2,3,7,8-TCDD), is the common name of 2,3,7,8-tetrachlorodibenzo-*p* – dioxin.
 38. Secondary organic aerosol comes from volatile organic compounds.
 39. In stratosphere layer, radicals $\text{HO}^\bullet$, $\text{O}^\bullet$, $\text{Cl}^\bullet$, & $\text{Br}^\bullet$ can abstract H atom from CH_4 .
 40. Herbicides are used to kill or control weeds.
 41. DNA breakage, inhibition, alteration and formation of DNA adduct arises due to Green house effect.
 42. Bio-polymers exemplify Green Chemistry principle # 10, which is design for degradation.
 43. Photo-degradation is the term which refers to the breakup within a compound due to microbial activity.
 44. A Prochloraz fungicide is an example of the imidazole-type.
 45. The VOCs abbreviation refers to the versatile organic chemicals.
 46. Organophosphate insecticides are divided into three subclasses (types A, B & C).
 47. Air pollution mainly concerns state of troposphere layer.
 48. Particulate matter (PM) is the term used to describe very small diameter solids or liquids that remain suspended in the atmosphere.
 49. Tebuthiuron herbicide belongs to heterocyclic ureas family.
 50. Green chemistry can provide green technology solutions for a sustainable future.
-



Final Exam For 2nd Year Students (Industrial Chemistry Programme Students-Biochemistry
(C-210))

Q1: Choose the correct answer A, B, C or D (1.25 each) (Final): (50 Marks)

Note: Please put your answers in the table at the end of the questions section:

- Which of the following fatty acids has the lowest melting point?
 - palmitic acid
 - oleic acid
 - linoleic acid
 - stearic acid
- Sugars that differ only in their stereochemistry at a single carbon are termed:
 - epimers
 - anomers
 - monomers
 - diastereomers
- Purine base attach through position to the pentose sugar.
 - N-1
 - N-9
 - N-3
 - N-7
- Lactose is a reducing sugar and consists of:
 - glucose + fructose, linked 1-2'
 - two glucose units linked 1-4'
 - galactose + glucose linked 1-4'
 - two glucose units linked 1-5'
- Alkaline hydrolysis of oils leads to the formation of:
 - metallic salt of fatty acids and glycerol
 - fatty acids and metallic salt of glycerol
 - metallic salt of fatty acids and metallic salt of glycerol
 - soap only
- Proteins are made up of α -amino acids units, linked together by:
 - peptide linkage
 - glycosidic linkage
 - phosphodiester linkage
 - ester linkage.
- Cellulose is a polysaccharide composed of several thousand of D-glucose units jointed by:
 - β -(1, 4') glycosidic linkage
 - β -(1, 2') glycosidic linkage
 - β -(1, 5') glycosidic linkage
 - β -(2, 5') glycosidic linkage
- The building blocks of nucleic acids are:
 - nucleotides
 - nucleosides
 - amino acids
 - monosaccharides
- Lipids include:
 - fats and oils
 - terpenes
 - steroids
 - all the previous
- Reaction of glucose with excess phenyl hydrazine followed by hydrolysis with conc. HCl gives:
 - glucosone
 - phenylglucoazone
 - fructose
 - arabinose
- Which one of these amino acids is not optically active?
 - cysteine
 - lysine
 - arginine
 - glycine
- Which one of the following acids converts glucose to 5-hydroxymethyl furfural aldehyde?
 - conc. H_2SO_4
 - conc. HCl

13. Lipids are compounds of biological origin that dissolve in:
 - a. polar solvents
 - b. aqueous buffer
 - c. nonpolar solvents
 - d. a & b
14. Nucleotides consist of the following components:
 - a. nitrogenous base + pentose sugar
 - b. phosphate group + nitrogenous base
 - c. pentose sugar + nitrogenous base + phosphate group
 - d. none of them
15. Which one of the following acids converts fructose to elemental carbon?
 - a. conc. H_2SO_4
 - b. conc. HNO_3
 - c. conc. HCl
 - d. conc. HF
16. The presence of double bonds in fatty acids:
 - a. lowers its melting point
 - b. raises its melting point
 - c. does not affect its melting point
 - d. reduces its susceptibility for rancidity
17. Which one of the following is not reducing sugar?
 - a. maltose
 - b. lactose
 - c. sucrose
 - d. glucose
18. Simple triglyceride contains:
 - a. three different fatty acid residues
 - b. three identical fatty acid residues
 - c. three identical alcohol residues
 - d. three different alcohol residues
19. Osazones are not formed with:
 - a. glucose
 - b. maltose
 - c. lactose
 - d. sucrose
20. D and L forms are determined by the orientation of the hydroxyl group ($-\text{OH}$) around:
 - a. the pre-last carbon atom
 - b. last carbon atom
 - c. first carbon
 - d. second carbon
21. Iodine number is used to measure the:
 - a. free acids in fat
 - b. degree of unsaturation
 - c. molecular weight
 - d. branching of the carbon chain
22. The gradual change of rotation of α and β anomers of glucose to equilibrium value is called:
 - a. epimerization
 - b. mutarotation
 - c. condensation
 - d. cyclization
23. Which pair of the following sugars gives the same osazone:
 - a. glucose & mannose
 - b. glucose & galactose
 - c. mannose & galactose
 - d. glucose & Lactose
24. Saponification number increasing as:
 - a. the molecular weight increase
 - b. the molecular weight decrease
 - c. the number of double bonds increases
 - d. the number of double bonds decreases
25. Maltose is a reducing sugar and consists of:
 - a. glucose + fructose, linked 1-2'
 - b. two glucose units linked 1-4'
 - c. galactose + glucose linked 1-4'
 - d. two glucose units linked 1-5'
26. Polyunsaturated fatty acids:
 - a. can be synthesized in human body
 - b. their deficiency in diet leads to nutrition deficiency diseases
 - c. cannot be synthesized in human body

27. Soap:
- lowers the surface tension of fats or oils
 - increases the surface tension of fats or oils
 - has nonpolar alkane group with a polar group at the end
 - a & c
28. Oxidation of glucose with nitric acid gives:
- saccharic acid
 - gluconic acid
 - glucuronic acid
 - glycolic acid
29. Which of the following statements is not true about fatty acids?
- their double bonds generally have the cis configuration
 - the double bonds are conjugated
 - they are long-chain carboxylic acids
 - most naturally occurring fatty acids have an even number of carbon atoms
30. Which of the following statements is not true about the double helix structure of DNA?
- the two strands of DNA were aligned anti-parallel to each other
 - the two strands of DNA were aligned parallel to each other
 - the purine and pyrimidine bases of both strands are stacked inside the helix
 - there is an interstrand H-bonding between DNA bases of the two strands
31. Lipids associating substance include:
- vitamins (E and K)
 - carotenoids
 - squalene
 - all of them
32. The five-membered sugar is called
- Pyranose
 - furanose
 - Triose
 - none of them
33. Glucose has stereoisomers.
- 4
 - 8
 - 12
 - 16
34. Reduction of fructose by Na/Hg gives
- sorbitol and mannitol
 - sorbitol
 - mannitol
 - none of them
35. The most favorable energetically conformation of a 6-membered ring is:
- boat
 - twist boat
 - half chair
 - chair
36. Glucose is converted to mannose by the effect of heating with
- organic base
 - organic acid
 - inorganic acid
 - inorganic base
37. The two strands of DNA are
- identical
 - not identical
 - complementary
 - b and c
38. The trans double bonds have effect on the melting point as compared to cis double bonds of the fatty acid.
- a smaller
 - a larger
 - an equal
 - no effect
39. Arabinose can be converted to glucose by the effect of
- Br₂ water
 - HCN
 - Na/Hg water
 - conc HNO₃

40. Vitamin C

- a. is a reducing agent
- b. is an oxidizing agent
- c. gives violet colour with ferric chloride
- d. a & c

❖ Answers' table

1	9	17	25	33
2	10	18	26	34
3	11	19	27	35
4	12	20	28	36
5	13	21	29	37
6	14	22	30	38
7	15	23	31	39
8	16	24	32	40

Q2: Put (✓) in the front of the correct statements and (X) in the front of the wrong one: (1.25 Mark each) (Mid Term + Activities+ Oral): (50 Marks)

Note: Please put your answers in the table at the end of the questions section:

- Waxes are esters of fatty acids with glycerol.
- Disulphide bond is one of the essential forces that hold the tertiary structure of the protein.
- Saponification number is the number of milligrams of KOH required to completely saponify 100 grams of fat or oils.
- Diastereomers differ in more than one chiral center and they are mirror images.
- The products of rancidity are toxic and cause food poisoning.
- The unfolded protein should have activity.
- The molecular formula of carbohydrates is $(CH_2O)_n$ where $n < 3$.
- RNA is distributed through the cell.
- Addition of antioxidants to fat can prevent rancidity.
- Different sequences of the proteins must have different structures.
- Iodine number of tristearin is 85.47 gm (Mol. Wt of tristearin= 891.48, A. Wt of Iodine= 127).
- Tertiary structure is assembled from secondary structural elements like α -helix and β -strand from one polypeptide chain.
- Glycoprotein on the cell surface is important for communication between cells.
- Insufficient vitamin C will lead to inadequate Lys / Pro hydroxylation and weaker cross-linking of collagens.
- Messenger RNAs (mRNAs) are components of ribosomes.
- Uracil base occurs in DNA only.
- Nucleotide monomers can be linked together via a peptide bond.
- RNA is more stable than DNA.
- Derived lipids are characterized by the presence of a non-fat product.
- All amino acids containing one amino group and one carboxylic group.
- In hard water, soap forms insoluble salts.
- Hydrolytic rancidity results from the oxidation of fat or oil.
- Tyrosine is the most susceptible amino acid for phosphorylation.
- Disulfide bond formation is one of the post-translational modification processes in the protein.
- Ketonic Rancidity is due to the contamination of fat with certain fungi such as *Aspergillus Niger*.
- Iodine number is the number of grams of iodine absorbed by one gram of fat or oil.
- Acidity of ascorbic acid is due to the stabilization of the ascorbate ion.
- Saccharides bearing anomeric carbons that have not formed glycosides are called 'reducing sugars'.

30. Polarimeter is used to measure the optical activity of carbohydrates molecules in solution.
31. In the β anomer, the OH group at the anomeric carbon is on the opposite side of the CH_2OH group.
32. Inter-strand hydrogen bonds can form between $\text{C}=\text{O}$ groups of one strand and $\text{N}-\text{H}$ groups on an adjacent β -strand and vice versa.
33. Adenosine 3', 5'-cyclic monophosphate (cyclic AMP, or cAMP) is an important regulatory nucleotide.
34. Transfer RNA (tRNA) carries specific amino acids to ribosomes during protein assembly.
35. Acidic amino acids show a lower pK_a value than basic amino acids.
36. RNA has a higher molecular weight than DNA.
37. Non-reducing sugars give silver mirror with Tollen's reagent.
38. Ascorbic acid can form a phenyl hydrazone.
39. Glycogen is highly branched than amylopectin.
40. Arachidonic acid is an important component of phospholipids.

❖ Answers' table

1	9	17	25	33
2	10	18	26	34
3	11	19	27	35
4	12	20	28	36
5	13	21	29	37
6	14	22	30	38
7	15	23	31	39
8	16	24	32	40

Good Luck...

Dr. Ahmed Mahmoud Sayed

[illegible]

- 7 If the sol particles in a given colloid move towards the cathode, the dispersion medium carries charge.
 A) no B) positive C) negative D) sometimes positive and sometimes negative
- 8 The scattering of light by the dispersed phase is called
 A) Brownian movement B) Tyndall effect C) adsorption D) electrophoresis
- 9 The species constituting the dispersed particles in multimolecular colloids are held together by
 A) ionic bonds B) covalent bonds C) Van der Waals' forces D) multimolecular forces
- 10 A one component system has four phases. Can the four phases co-exist in equilibrium ?
 A) yes B) no C) sometimes D) none of these
- 11 The number of components in a solution of common salt is
 A) zero B) 1 C) 2 D) 3
- 12 The vapour pressure of the metastable phase is always than that of the stable phase at the same temperature.
 A) lower B) higher C) the same D) none of these
- 13 Decomposition of calcium carbonate in a closed vessel has the number of phases and components equal to....., respectively.
 A) 2,2 B) 2,3 C) 3,2 D) 3,3
- 14 The phase rule equation can expressed by.....
 A) $F + P = C + 2$ B) $F = C - P + 2$ C) $P = C - F + 2$ D) all of these
- 15 In phase diagram of sulphur, three phases, namely,, co-exist in equilibrium at the transition point (95.6 °C).
 A) S_R, S_M, S_V B) S_R, S_M, S_L C) S_M, S_L, S_V D) none of these
- 16 For a pure gas and a mixture of two gases (He and H_2) the degrees of freedom equal to..... and respectively.
 A) 2 and 2 B) 2 and 3 C) 3 and 2 D) 3 and 3

- 17 At eutectic point both and are fixed.
 A) temperature and composition B) temperature and pressure
 C) component and degrees of freedom D) none of these
- 18 The standard free energy (ΔG^0) for $\text{Au} | \text{Au}^{3+} || \text{Ca}^{2+} | \text{Ca}$ cell is kJ mol^{-1}
 ($E^\circ_{\text{cell}} = 4.37 \text{ v}$)
 A) 2.53×10^3 B) 2.53×10^4 C) 2.53×10^{-3} D) None of these
- 19 Which of the following statements is true for the following reaction:
 $2\text{Fe}^{3+}(\text{aq}) + 2\text{Br}^-(\text{aq}) = 2\text{Fe}^{2+}(\text{aq}) + \text{Br}_2(\text{l})$ ($E^\circ \text{Fe}^{3+}/\text{Fe}^{2+} = +0.77 \text{ v}$, $E^\circ \text{Br}^-/\text{Br}_2 = +1.07 \text{ v}$)
 A) $E^\circ = -1.83 \text{ V}$ and it is not spontaneous B) $E^\circ = -0.30 \text{ V}$ and it is not spontaneous
 C) $E^\circ = +0.30 \text{ V}$ and it is spontaneous D) $E^\circ = +1.83 \text{ V}$ and it is spontaneous.
- 20 A Zn-Zn^{2+} concentration cell contains two compartments with $[\text{Zn}^{+2}] = 1.8\text{M}$ and $[\text{Zn}^{+2}] = 1.0 \times 10^{-2}\text{M}$, its emf will be ($E^\circ \text{Zn}^{2+}/\text{Zn} = -0.76 \text{ v}$):
 A) $+0.0668 \text{ V}$ B) -0.0668 V C) 1.522 V D) -3.84 V
- 21 The following equation has an equilibrium constant K_{eq} of 6×10^{25} . Which of the following correctly describes the standard electrode potential, E° , and the standard Gibbs free energy change, ΔG° ?

$$\text{Zn(s)} + 2\text{H}^+(\text{aq}) \rightarrow \text{Zn}^{2+}(\text{aq}) + \text{H}_2(\text{g})$$

 A) Both ΔG° and E° are zero B) Both ΔG° and E° have the same sign
 C) ΔG° is negative, and E° is positive D) ΔG° is positive, and E° is negative.
- 22 What is the potential of the following reaction that has a ΔG° of -264 kJ/mol ?

$$\text{Na}^+ + \text{Cl}^- \rightarrow \text{NaCl}$$

 A) 2.73 B) Zero C) 1.37 D) -2.73
- 23 What is the pH of the unknown acidic solution in the following cell?

$$\text{H}_2(1 \text{ atm}) | \text{Pt(s)} | \text{H}^+(x \text{ M}) || \text{Cu}^{2+}(1\text{M}) | \text{Cu(s)},$$

$$E_{\text{cell}} = 0.44 \text{ V at } 25^\circ\text{C}, \quad E^\circ_{\text{Cu}^{2+}/\text{Cu}} = 0.34 \text{ V}$$

 A) 1.7 B) 2 C) 3 D) 4

24	Consider the following: $Cl_2 \rightarrow ClO_3^-$ the balanced half reaction is: A) $Cl_2 + 3H_2O \rightarrow ClO_3^- + 6H^+ + 5e^-$ B) $Cl_2 + 3H_2O \rightarrow 2ClO_3^- + 6H^+ + 4e^-$ C) $Cl_2 + 4H_2O + 2e^- \rightarrow 2ClO_3^- + 6H_2$ D) $Cl_2 + 6H_2O \rightarrow 2ClO_3^- + 12H^+ + 10e^-$
25	The potential of a membrane nerve when the concentration of K^+ ions in the interior and exterior of a nerve cell are 400 mM and 15 mM, respectively is A) 84 mv B) 90 mv C) 106 mv D) None of these

Part II: Midterm, Oral, Activity): (50 Marks)

Q2: Shade (T) for True statements or (F) for False statements: (Two Marks each)

No.	Phrase
26	Pearl is an example of solid dispersed in solid.
27	Colloidal dispersion of starch, proteins, gelatin, cellulose, nucleic acids are multimolecular colloids.
28	A sol of As_2S_3 moves to the positive electrode.
29	The Brownian motion is due to bombardment of the molecules of the medium by the dispersed particles.
30	The movement of a charged sol particle through a liquid under the influence of an applied potential difference is called electrophoresis .
31	The function of an emulsifier is to stabilize a sol.
32	Soap in water is termed colloid, whereas in alcohol is termed crystalloid.
33	Ph.Pn sol can be prepared by lowering of its solubility by exchange of solvent.
34	The two metals Ag and Pb are completely miscible in liquid state.
35	From cooling curve, it is possible to obtain the freezing point or eutectic temperature.

36	At normal melting point of ice (0°C , 1 atmospheric pressure) only ice and water exist together.
37	The three phases S_R , S_L , S_V co-exist in equilibrium at melting point of S_M (119°C) in phase diagram of sulphur system.
38	For salt-water system the eutectic point is called the cryohydric point.
39	The phase diagram of sulphur system at metastable equilibrium consists of three areas, three curves and one triple point.
40	Below the eutectic temperature no liquid phase of any composition can exist.
41	The fusion of monoclinic sulphur into liquid is accompanied by decrease of volume.
42	The phase diagram of water at high pressure indicates the existence of seven stable forms of ice.
43	The more positive E° is the greater the tendency for the substance to be reduced.
44	Potential of the standard calomel electrode depends on the concentration of Hg_2Cl_2 and Cl^-
45	Oxidation number of manganese in MnO_4^{2-} species is +1
46	When hydrogen gas reacts with calcium metal, the oxidation numbers of the calcium and hydrogen in the produced CaH_2 product are - 2 and + 1, respectively.
47	The emf of the Cd-Cu cell in which Cd is in contact with 0.002M CdSO_4 and Cu is in contact with 0.02M CuSO_4 solution is 0.65 V, where ($E^{\circ} \text{Cu}^{2+}/\text{Cu} = + 0.34 \text{ v}$, $E^{\circ} \text{Cd}^{2+}/\text{Cd} = - 0.4 \text{ v}$)
48	In electrolytic cell, reaction does not occur naturally and require external energy.
49	Potential of oxygen electrode depends on the pressure of O_2 gas and concentration of OH^- ions.
50	The equilibrium constant for the $\text{Ag} \text{Ag}^+ \text{Fe}^{2+} \text{Fe}$ is 1.23×10^{-42} ($E^{\circ} \text{Fe}/\text{Fe}^{2+} = - 0.44 \text{ v}$, $E^{\circ} \text{Ag}/\text{Ag}^+ = + 0.80 \text{ v}$).

Good Luck

Prof. Dr. Maher M. Girgis, Prof. Dr. Maher M. A. Hamed and Dr. Mohamed N. Abd El-Hamed.



Faculty of Science

24 June 2021

Chemistry Department

Time allowed: 2 hours

Final Examination of Introductory Quantitative Analysis

For 2nd Level Students (C – 240)

Answer the following questions :

(80 degree)

Section (A) : (Final Examination)

(50 degree)

I – Write (true) or (false) in front of the following statements :

(2 degree for each)

- 1- EDTA is a chelating agent. ()
- 2- EDTA is a pentadentate ligand ()
- 3- Volhard method must be carried out in nitric acid solution ()
- 4- Oxidation is a gain of electrons. ()
- 5- A precipitate has a tendency to adsorb one of its own ions present in solution... ()
- 6- KMnO_4 is a reducing agent. ()
- 7- Diphenylamine is a redox indicator. ()
- 8- Accuracy is defined as the closeness of the measured value to the true value. ()
- 9- Methyl orange is a redox indicator. ()
- 10- F – test tells us whether two standard deviations are significantly different from each other. ()
- 11- Ionic strength is a measure of the total concentration of ions in solution. ()
- 12- H_2PO_4^- and HPO_4^{2-} are a conjugate acid base pair. ()
- 13- Lewis acid is a substance that donate protons. ()

II- Choose the correct answers:

(2 degree for each)

- 1- is used as an indicator in Mohr method.
a) FeSO_4 b) $\text{K}_2\text{Cr}_2\text{O}_7$ c) K_2CrO_4 d) MnCl_2
- 2- The normal concentration of 0.1 M H_2SO_4 solution is
a) 0.05 b) 0.1 c) 0.15 d) 0.2
- 3- The titer is number of mg of analyte that react with ml.
a) 1.0 b) 2.0 c) 3.0 d) 4.0
- 4- The ppm concentration of a solution that is containing 5 mg solute /L.
a) 2.5 ppm b) 5.0ppm c) 7.5 ppm d) 10 ppm
- 5- The molal concentration is the number of moles dissolved in
a) 1L b) 1000 g c) 100 ml d) 100g

- 6- Argentometric titration are used to determine
 a) Cl^- , Br^- b) I^- c) CN^- , CNS^- d) the all
- 7- The number 0.0670 has significant figures.
 a) 2.0 b) 3.0 c) 4.0 d) 5.0
- 8- For the following set of analytical results 15.67 g, 15.69 g and 16.03 g, the standard deviation is
 a) 0.2 b) 0.3 c) 0.4 d) 5.0
- 9- A solution is 0.2 M in acetic acid ($\text{pK}_a = 4.76$) and 0.2 M in sodium acetate, the pH of this solution is
 a) 4.76 b) 5.76 c) 3.76 d) 5.87
- 10- A diprotic acid H_2A ($\text{pK}_{a1} = 3.05$, $\text{pK}_{a2} = 4.50$), the principle form exists at pH 5.0 is
 a) H_2A b) HA^- c) A^{--} d) non of these
- 11- In a titration of weak acid with strong base, the pH at the equivalent point is
 a) acidic b) neutral c) alkaline d) non of these
- 12- A set of three replicate analytical results has a mean of 93.50 and a standard deviation of 0.075. The confidence limit at (95 %CL, $t = 4.303$) is
 a) 93.50 ± 0.17 b) 93.50 ± 0.18 c) 93.50 ± 0.19 d) 93.50 ± 0.16

Section (B): (Mid term, Activity and Oral Questions): (30 degree)

I – Write (true) or (false) in front of the following statements: (2 degree for each)

- 1- Substitution titration is a type of EDTA titration ()
- 2- Chelatometric titration is a type of complexometric titration ()
- 3- Fajan's method is based on the use of adsorption indicator ()
- 4- Buffer solutions resist the change in pH upon adding strong acid or strong base ()
- 5- Autoproteolysis is the self- ionization of a solvent to give cation and anion ()
- 6- Equivalent point is the point at which the reaction is observed to be complete ()
- 7- Significant figures is the minimum number of digits needed to write a given value in scientific notation without loss of accuracy. ()

II- Choose the correct answers: (2 degree for each)

- 1- For a redox reaction $\log K_{eq} =$
 a) $n (E_1 - E_2) / 0.059$ b) $n (E_1 + E_2) / 0.059$ c) $0.059 (E_1 - E_2) / n$ d) $0.059 (E_1 + E_2) / n$
- 2- In $[\text{Cu}(\text{:NH}_3)_4]^{2+}$ complex Cu^{2+} acts as
 a) Lewis acid b) Lewis base c) Bronsted acid d) Bronsted base

- [illegible]

Examiners : Prof. Dr. Hassan M. Sedaira

Prof. Dr. Elham Y. Hashem

Assiut University	Faculty of Science	Date : 7/7/2021
Faculty of Commerce	Applied Industrial Chemistry	Duration: 2 hours
Business Administration Department	Marketing Research	Year : 2

QUESTION ONE:

CHOOSE THE CORRECT ANSWER :(Final exam) (50 marks)

- 1 - Consists of institutions that affect a society's basic values, perceptions and preferences.
 - A- Natural environment.
 - B- Cultural environment.
 - C- Political environment.

- 2 -is the third transition in the development of marketing concept.
 - A- Sales orientation.
 - B- Relationship marketing.
 - C- Consumer orientation.

- 3 - is perceived lack of something and the individual aware of it.
 - A- Want.
 - B- Need.
 - C- Demand.

- 4 - Is an orientation that holds marketers to take some responsibility for the needs of society at large.
 - A- Societal.
 - B- Consumer.
 - C- Production.

- 5 - Building customer relationships is the..... step in marketing process.
 - A- Second.
 - B- Third.
 - C- Forth.

- 6 -Is the final stage of the buying-decision process.
 - A- Need recognition.
 - B- Identification of alternatives.
 - C- None of the above.

7 - There are Stages of buying-decision process.

- A- Five.
- B- Six.
- C- Three.

8 - Time is considered as influences which affects buying behavior.

- A- Cultural.
- B- Informational.
- C- Situational.

9 - is defined as changes in behavior resulting from observation and experiences.

- A- Culture.
- B- Perception.
- C- Learning.

10 - is defined as an individual's patterns that influences behavioral responses.

- A- Personality.
- B- Perception.
- C- Behavior.

11- Is the process which identifies, anticipates and supplies customers effectively.

- A- Production.
- B- Promotion.
- C- Marketing.

12 - Provide the resources needed by company to produce goods and services.

- A- Competitors.
- B- Customers.
- C- Suppliers.

13 - Marketing intermediaries include the followings except.....

- A- Physical distribution firms.
- B- Media publics.
- C- Marketing services agencies.

14 -is the process of designing, gathering, analyzing, and reporting information that may be used to solve a specific marketing problem.

- A- Marketing
- B - Marketing research.
- C - Market research

15 -state what the researchers must do.

- A- Research problem
- B- Research objectives
- C- Research Design

16 - refers to determining how many elements of the population should be included in the sample.

- A- Population.
- B- Sample plan
- C- Sample size

17- A survey which is useful for interviewing busy executives.

- A- Telephone Surveys.
- B- In-Home Surveys.
- C- In-Office Surveys.

18- Using of pictures, audiovisuals and graphics is one of the key advantages of:

- A- Computer-Assisted Surveys.
- B- Person-Administered Surveys.
- C- In-Office Surveys.

19- Research design that describe the phenomena of interest.

- A-Exploratory Research.
- B- Descriptive research.
- C- Causal studies.

20- Marketing mix is:

- A- Product/service, Price, Promotion, and Distribution.
- B- Product/service, Price, Promotion, and Public relation.
- C- Product/service, Price, Promotion, E- marketing.

21 - Exploratory research methods include:

- A- Case Analysis.
- B- Focus Groups.
- C- A&B.

22- The following are key advantages of Person-Administered surveys except:

- A- Humans make errors.
- B- Feedback.
- C- Quality control.

23- Results, limitations, and conclusions appear at:

- A- Front Matter.
- B- Body.
- C- End Matter.

24-Is the “skeleton” of the report and serves as a summary for the busy executive or a preview for the in-depth reader.

- A- Reference list.
- B- Endnotes.
- C- Abstract/Executive Summary.

25- The consists all pages that precede the first page of the report.

- A- Front Matter.
- B- Body.
- C- End Matter.

QUESTION TWO:

CHOOSE THE CORRECT ANSWER: (Mid-year exam) (20 marks)

- 26- A process used to define the size, location, and/or makeup of the market for a product or service.
A - Marketing
B - Marketing research
C - Market research.
- 27-..... measure units from a sample of the population at only one point in time.
A- Cross-sectional studies.
B- Longitudinal studies.
C- Non of the above.
- 28- Key disadvantages of mail survey:
A- Nonresponse.
B- Self-selection bias.
C- A&B.
- 29- The group that has been exposed to a change in the independent variable:
A- Experimental group.
B- Control group.
C- None of the above .
- 30 - are any organizations or individuals that have actual or potential influences on the marketing organizations.
A- Promotion.
B- Marketing.
C- Publics.
- 31- Services are tangible product which cannot be owned.
A- Yes. B-No.
- 32- Learning is the process of receiving, organizing, and assigning meaning to the information detected by our five senses.
A- Yes. B- No

33- The final step of marketing process is creating value for the consumers.

A- Yes.

B- No.

34- The microenvironment consists of the actors close to the company such company, suppliers, competitors, and publics.

A-Yes.

B- No.

35- Marketing managers make the marketing strategies and plans.

A- Yes.

B- No.

QUESTION THREE:

CHOOSE THE CORRECT ANSWER:(Activity& Quiz& Oral) (30 marks)

36 -Services are distinguished from physical goods in that production usually happens as the same time as consumption.

A- Yes.

B- No.

37- A brand's value proposition is decided to design a customer- driven marketing strategy.

A- Yes.

B- No.

38- Negative disconfirmation between the expectation and the performance of the purchased products leads to dissatisfaction.

A- Yes.

B- No.

39- Sales orientation takes the view that the customer will ordinarily buy enough of the firm's products without persuasion to meet the firm's needs.

A- Yes.

B- No.

40- The mass production is prevailed in the production orientation of the marketing concept.

A- Yes.

B- No.

41- Companies which do not keep their product outdated have market opportunities.

A-Yes.

B -No.

- 42- People, time and physical evidence are types of marketing mix related to services.
A-Yes. B-No.
- 43- The production orientation in marketing concept usually prevails in market condition where supply exceeds demand.
A- Yes. B- No.
- 44- Primary data is relatively easy to access
A- Yes. B -No
- 45- Marketing Research System gathers information for a specific situation.
A- Yes B- No
- 46 - Defining the problem is considered the first step in the marketing research process.
A- Yes. B- No
- 47- Marketing research is always presented as an 11- step process.
A- Yes. B- No
- 48- Good research design is the "first rule of good research .
A- Yes B- No.
- 49 - Results are the most important portion of your report.
A- Yes B- No.
- 50 - Telephone Surveys are limited in the quantity and types of information obtainable .
A- Yes B- No.

BEST WISHES



July 05, 2021
Time: 3 hours

Final Examination of Organic Chemistry II (212C) for Credited Hours Students

Answer the following questions:

(80Marks)

First question:

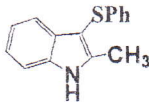
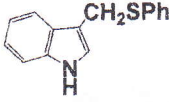
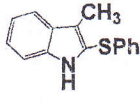
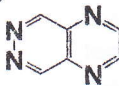
Choose the correct answer for the following: (50 Marks)

- All of the following compounds are aromatic *except*.....
a) anthracene b) Cyclopropenyl anion c) Toluene d) Cyclododecahexaene
- According to Hückel Rule the n value of Cyclopentadienyl anion is
a) 0 b) $1/2$ c) 1 d) $2/3$
- All the following names are correct for  *except*
a) Styrene b) Allylbenzene c) Vinylbenzene d) Phenylethene
- All the following experiments confirm the Kekulé structure of benzene *except*
a) In catalytic hydrogenation, it consumed three molecules of hydrogens
b) Monosubstitution of Benzene gave only one product
c) Disubstitution of Benzene gave only three products
d) In Ozonolysis, it consumed 3 molecules of Ozone
- Wheland intermediate of the electrophilic substitution of anisole is stabilized by..... resonating structures
a) 2 b) 3 c) 4 d) 5
- NH_2 group in aniline is characterized with..... towards phenyl group
a) Positive inductive effect b) Positive mesomeric effect c) Negative inductive effect d) b & c
- Heating (3-chlorobutoxy)benzene with AlCl_3 gives
a) Phenol b) Butoxybenzene c) anisole d) 4-methyldihydrobenzopyrane
- The major product in the nitration of *m*-bromotoluene is
a) 5-bromo-2-nitrotoluene b) 3-bromo-2-nitrotoluene
c) 3-bromo-4-nitrotoluene d) 3-bromo-5-nitrotoluene
- The minor product in the chlorination of *m*-aminoanisole is
a) 5-methoxy-2-chloroaniline b) 3-methoxy-2-chloroaniline
c) 3-methoxy-4-chloroaniline d) No thing
- In the sulphonation of toluene, the following sentences are correct *except*.....
a) The electrophile is SO_3
b) The major product is 2-toluenesulphonic acid
c) Three isomers are expected to be formed
d) The sulphonation of the formed product is slower than toluene
- Synthesis of Saccharin can be achieved starting from
a) *p*-toluenesulphonic acid b) *m*-toluenesulphonic acid
c) *o*-toluenesulphonic acid d) *o*-aminophenol

12. *o*-Chloronitrobenzene $\xrightarrow{\text{Cu}/\Delta}$

- a) 4,4'-Dinitrobiphenyl b) 2,2'-Dinitrobiphenyl c) 2,2'-Dichlorobiphenyl d) 2,2'-chloronitrobiphenyl

13. The major product of the nitration of acetanilide is
 a) *p*-nitroaniline b) *o*-nitroaniline c) *p*-nitroacetanilide d) *o*-nitroacetanilide
14. Oxidation of gives Benzoic acid
 a) Toluene b) ethylbenzene c) propylbenzene d) all previous
15. Treating picryl chloride with ammonia gives
 a) Picric acid b) Picrylamide c) TNT d) Amm. Picrate
16. Nitration of nitrobenzene using zinc and amm. chloride gives
 a) aniline b) *N*-phenylhydroxylamine c) Hydrazobenzene d) Azobenzene
17. Benzene $\xrightarrow{\text{(i)H}_2\text{SO}_4/\text{HNO}_3 \quad \text{(ii)CH}_3\text{Cl}/\text{AlCl}_3 \quad \text{(iii)Zn}/\text{HCl} \quad \text{(iv)H}_2\text{O}/\Delta \quad \text{(v)(CH}_3)_2\text{CHCl}/\text{AlCl}_3}$
 a) Cumene b) Thymol
 c) pyrogallol d) anisol
18. Hofmann reaction of benzamide gives
 a) Benzoic acid b) Benzene c) aniline d) Amm.benzoate
19. The correct order of basicity is
 a) aniline > *p*-anisidine > *m*-anisidine > *p*-nitroaniline b) aniline > *m*-anisidine > *p*-anisidine > *p*-nitroaniline
 c) *p*-anisidine > aniline > *m*-anisidine > *p*-nitroaniline d) *p*-anisidine > *m*-anisidine > aniline > *p*-nitroaniline
20. Reducation of benzenediazonium salt with Zn/HCl gives
 a) Aniline b) *N*-phenylhydroxylamine c) Phenylhydrazine d) Benzidine
21. Heating benzenediazonium salt with methanol gives
 a) phenol b) *p*-methylaniline c) anisol d) *p*-methylphenol
22. *s*-Tribromobenzene can be prepared from benzene by the following steps
 a) (i)bromination, (ii)decarboxylation, (iii)alkylation then (iv)oxidation
 b) (i) bromination, (ii) alkylation, (iii)oxidation then (iv) decarboxylation
 c) (i) alkylation, (ii) bromination, (iii)oxidation then (iv) decarboxylation
 d) (i) bromination, (ii)decarboxylation, (iii)alkylation then (iv)oxidation
23. Fluorenone can be synthesized from
 a) 2-methylbenzophenone b) 2-aminobenzophenone
 c) 3-methylbenzophenone d) 3-aminobenzophenone
24. Benzene $\xrightarrow{\text{(i)NO}_2^+ \quad \text{(ii)Zn}/\text{HCl} \quad \text{(iii)NaNO}_2/\text{HCl} \quad \text{(iv)CuCN}/\text{KCN} \quad \text{(v)H}_3\text{O}^+}$
 a) Benzonitrile b) Benzaldehyde
 c) Benzoic acid d) Benzylamine
25. Cumene $\xrightarrow{\text{(i)H}_2\text{SO}_4/\text{HNO}_3 \quad \text{(ii)HNO}_3 \quad \text{(iii)H}_3\text{O}^+/\Delta}$
 a) 2,4-dinitrocumene b) 2-nitrocumene
 c) 4-nitrocumene d) 4-nitro-2-cumenesulphonic acid
26. The reaction of 2-Chloropyridine with Sodamide in toluene to produce 2-aminopyridine is called:
 a) Fischer Reaction b) Chichibabin Reaction c) Paal-Knorr Reaction
27. Leaving groups at C₂ in indole can be displaced by:
 a) Electrophile b) Nucleophile c) Free Radical
28. Formylation of reactive aromatic compounds by using POCl₃/DMF in acidic medium its called
 a) Vilsmeier Reaction b) Mannich Reaction c) Knorr Synthesis
29. In nitration of pyrrole the reagents used are:
 a) HNO₃/H₂SO₄ b) AcONO₂/AcOH c) AcONO₂/HNO₃
30. α-Halocarbonyl compounds react with 1,3-dicarbonyl compounds in presence of base to give:
 a) Furan b) Pyridine c) Thiophene

31. 1,4-Dicarbonyl compounds can be reacted with source of sulfur(P_2S_5) to give:
a) Quinoline b) Thiophene c)Pyrimidine
32. Reaction between α,β -unsaturated esters or ketones and tosylmethylisocyanide to give:
a) Indole b) Pyrrole c)Quinoline
33. The electrophilic substitution reaction of 1,3-Azole occurs mainly at:
a) C_2 b) C_4 c) C_5
34. Condensation of Two moles of a β -dicarbonyl compound, One mole of aldehyde and One mole of ammonia are produced:
a) Quinoline b) Pyridine c)Indole
35. Reaction of phenyl hydrazine with $PhSCH_2COCH_3$ under acidic condition to give-----as a major product.
a)  b)  c) 
36. The nomenclature of heterocyclic compounds in ring containing two or more different heteroatoms takes precedence.
a) O,S,N b) N,S,O c)S,N,O
37. Which of the following compounds is Five member ring?
a) Quinoline b) Pyridine c)Thiophene
38. Which of the following compounds, is Not aromatic ?
a) Pyrrole b) 1,3,5-Hexatriene c)Indole
39. Treatment of urea with α -formyl acetic acid in presence of conc. H_2SO_4 to give.
a) Pyrazine b) Pyridazine c)Pyrimidine
40. When thiophene reacts with Br_2 in diethyl ether to give:
a) 2-Bromothiophene b) 3- Bromothiophene c)2,3-Dibromothiophene
41. The IUPAC name of this structure

a) Pyrazino[2,3-*d*]Pyridazine b) Pyrazino[2,3-*c*]Pyridazine c)Pyridazine[2,3-*d*]Pyrazine
42. Reaction of acetyl acetone with hydrazine hydrate to give:
a) Pyrazole b) Imidazole c)Oxazole
43. Vilsmeier reaction of 3-methylfuran with $POCl_3$ /DMF to give
a) 3-Formylfuran b) 3-Methyl-2-formylfuran c)4-Formyl-3-methylfuran
44. Disconnection way to synthesis essentially involves working backwards from the a target molecule in a logic manner is called:
a) Retrosynthesis b) Classical Synthesis c)Biosynthesis
45. A planar, cyclic system of unsaturated carbon atoms containing $(4n+2)\pi$ electrons will be aromatic, when, (n) is positive integer or zero is called :
a) Anti-Markovnikov rule b) M.O.Theory c)Huckel rule
46. Cycloaddition of an azide(NaN_3) and an acetylene the best method for preparation of :
a)1,2,3-Triazole b)1,2,4-Triazole c)1,2,4-Triazine
47. In the electrophilic substitution reactions of (i)pyrrole (ii)Furan (iii) Thiophene, the correct order of reactivity is:
a) i > ii > iii b) iii > i > ii c)ii > i > iii
48. Which of the following statements is correct?
a) Pyrimidine is a diazole b) Pyrrole is a strong base
c)Quinoline and Isoquinoline are isomers
49. Suffixes of heterocyclic compounds having a six member ring is:
a) -ole b) -ine c)-epine
50. Reaction of heterocyclic compounds with RNH_2/CH_2O in acidic condition is called :
a) Hinsberg Reaction b) Mannich Reaction c)Paal-Knorr Reaction

Second question:

Choose the correct answer for the following: (30 Marks)

51. All the following are dihydric Phenols except

- a) Catechol b) phloroglucinol c) resorcinol d) quinol

52. the correct order of acidity is

- a) phenol > *m*-cresol > *p*-cresol > *p*-nitrophenol b) *p*-nitrophenol > *m*-cresol > *p*-cresol > Phenol
c) *p*-nitrophenol > Phenol > *m*-cresol > *p*-cresol d) *p*-cresol > *m*-cresol > Phenol > *p*-nitrophenol

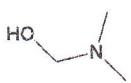
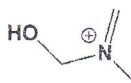
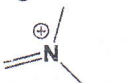
53. *p*-nitrophenolate ion is stabilized by resonating structures

- a) 3 b) 4 c) 5 d) 6

54. Oxidation of cumene gives

- a) Benzoic acid b) cresol c) phenol d) glyoxal

55. The intermediate in Mannich reaction of phenol using formaldehyde and dimethylamine is

- a)  b)  c)  d) 

56. Kolbe Schmidt reaction of resorcinol gives

- a) 6-hydroxysalicylic acid b) 4-hydroxysalicylic acid
c) 6-hydroxysalicylaldehyde d) 4-hydroxysalicylaldehyde

57. The reagents of Reimer Tiemann Reaction is

- a) $\text{CHCl}_3/\text{NaOH}$ b) CCl_4/NaOH c) NaNO_2/HCl d) Mg/ether

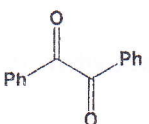
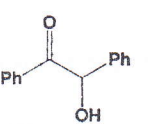
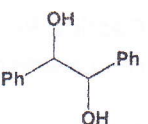
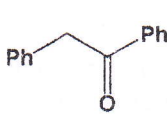
58. *o*-nitrophenol has lower melting point than *p*-isomer because

- a) The presence of intramolecular hydrogen bonds in *o*-nitrophenol
b) The presence of intermolecular hydrogen bonds *o*-nitrophenol
c) The presence of intramolecular hydrogen bonds in *p*-nitrophenol
d) The presence of intermolecular hydrogen bonds *p*-nitrophenol

59. Sulphonic group in benzenesulphonic acid

- a) Deactivates the further electrophilic substitution reaction
b) Directs the further electrophile towards meta positions
c) Increases the solubility in water
d) All the above

60. $\text{PhCHO} \xrightarrow{\text{KCN}}$

- a)  b)  c)  d) 

61. Reaction of benzaldehyde with NaOH giving benzyl alcohol and sod. Benzoate is known as

- a) Perkin's Reaction b) Aldol reaction c) Benzoin Condensation d) Cannizaro's reaction

62. The correct order in the electrophilic nitration reaction is

- a) Aniline > acetanilide > toluene > benzene b) Acetanilide > toluene > aniline > benzene
c) Acetanilide > toluene > benzene > aniline d) Aniline > benzene > acetanilide > toluene

63. The following is correct about electrophilic substitution reactions of benzene except

- a) Generation of electrophile b) Formation of resonance-stabilized cation
c) Hydride abstraction d) Formation of substituted benzene

64. $\text{nitrobenzene} \xrightarrow{\text{(i) H}_2\text{SO}_4/\text{HNO}_3 \text{ (ii) (NH}_4\text{)}_2\text{S (iii) NaNO}_2/\text{HCl (iv) H}_2\text{O}/\Delta}$

- a) Nitrobenzene b) 3-Nitrophenol c) 2-Nitrophenol d) Resorcinol

65. $\text{Benzaldehyde} \xrightarrow{\text{(i) Ac}_2\text{O (ii) H}_3\text{O}^+}$

- a) Benzoic acid b) Cinnamic acid c) Cinnamaldehyde d) 3-Acetybenzaldehyde
66. Acylation of Pyrrole with Ac_2O at 200°C leads:
- a) 2-Acetylpyrrole b) 3-Acetylpyrrole c) a & b
67. Reaction between α -amino ketones with carbonyl compounds which have an α -methylene group to give:
- a) Pyrrole b) Indole c) Pyrazine
68. The electrophilic substitution reactions of pyrimidine occur mainly at:
- a) C_2 b) C_4 c) C_5
69. The classical Skraup synthesis is exemplified by the reaction of aniline with glycerol under acidic conditions to produce :
- a) Quinoline b) Isoquinoline c) Indole
70. Nucleophilic substitution reactions of quinoline occur mainly at :
- a) C_2 b) C_3 c) a & b
71. 4-Chloropyridine undergoes replacement of halogen when reacted with:
- a) Nucleophile b) Electrophile c) Free Radical
72. Synthesis of pyridine by condensation of β -dicarbonyl compounds and aldehydes in presence of NH_3 is called :
- a) Hantzsch synthesis b) Fischer synthesis c) Knorr synthesis
73. Fischer synthesis is the condensation of an aryl hydrazine with a ketone followed by cyclization under acidic conditions afforded:
- a) Pyrrole b) Pyrimidine c) Indole
74. Nitration of imidazole with HNO_3 at R.T. to give:
- a) 2-Nitroimidazole b) 3-Nitroimidazole c) 5-Nitroimidazole
75. Nucleophilic substitution reaction in 1,3-Azoles occurs mainly at:
- a) C_2 b) C_4 c) C_5
76. The order of basicity in : (i) Imidazole (ii) Thiazole (iii) Oxazole is :
- a) $i > ii > iii$ b) $iii > ii > i$ c) $ii > i > iii$
77. Acylation of a five membered ring with one hetero atom in AlCl_3 /ether through Friedel-Crafts acylation to give:
- a) 2-Acetylthiophene b) 2-Acetylfuran c) 2-Acetylpyrrole
78. The order of aromaticity in: (i) Pyrrole (ii) Thiophene (iii) Furan is:
- a) $ii > i > iii$ b) $i > ii > iii$ c) $iii > ii > i$
79. The formylation reaction means insertion of ----- group into heterocyclic ring:
- a) $-\text{NH}_2$ b) $-\text{COOH}$ c) $-\text{CHO}$
80. Acylation of indole in Ac_2O / AcOH as a solvent to give :
- 1,3-Diacetylindole 2-Acetylindole 3-Acetylindole

GOOG LUCK

Examiners: Prof. Dr. Zeinab Hozien, Dr. Ahmed A. Omar & Dr. Awad I. Said



Final exam in Organic chemistry 211C course for non chemistry students

Answer the following questions: (80 marks)

Question 1: Choose the correct answer for the following questions: هذا السؤال خاص بامتحان النظرى (50 marks)

- Which of the following is electrophile:
i. FeCl_3 ii. $\text{C}_2\text{H}_5\text{OH}$ iii. H_2O
- Which of the following is polar protic solvent:
i. CH_3OH ii. CH_3COCH_3 iii. C_6H_{14}
- Which is true about carbocation:
i. SP^3 hybridized ii. Nucleophile iii. Has 6-electrons
- Bromination of 1,3-butadiene mainly give:
i. 1,2-dibromo-1-butene ii. 1,4-dibromo-2-butene iii. 3-bromo-butene
- Reaction of toluene ($\text{C}_6\text{H}_5\text{CH}_3$) with bromine in the presence of sun light to give benzyl bromide ($\text{C}_6\text{H}_5\text{CH}_2\text{Br}$) was considered:
i. electrophilic substitution reaction ii. Nucleophilic substitution reaction
iii. Free radical substitution reaction.
- Reaction of benzene (C_6H_6) with bromine in the presence of AlBr_3 to give bromobenzene was considered:
i. electrophilic substitution reaction ii. Nucleophilic substitution reaction
iii. Free radical substitution reaction.
- Which is wrong about the $\text{S}_{\text{N}}1$ Mechanism:
i. multistep reaction ii. Unimolecular reaction iii. Has one transition state
- Which of the following is the most acidic carboxylic acid:
i. $\text{BrCH}_2\text{CH}_2\text{COOH}$ ii. $\text{ClCH}_2\text{CH}_2\text{COOH}$ iii. $\text{FCH}_2\text{CH}_2\text{COOH}$
- The reaction of acetone with HCN to give acetone cyanohydrin ($\text{CH}_3\text{C}(\text{OH})(\text{CN})\text{CH}_3$) was considered:
i. electrophilic addition reaction ii. Nucleophilic addition reaction
iii. Free radical addition reaction
- Which of the following free radicals is the less stable:
i. $\cdot\text{CH}_3$ ii. $\text{H}_3\text{C}\cdot\text{CHCH}_3$ iii. $\cdot\text{C}(\text{CH}_3)_3$
- While vinyl alcohol is not stable it can't be isolated which converted into:
i. Acetone ii. Acetaldehyde iii. Ethyl alcohol
- Which of the following compound is classified as allylic halide:
a. $\text{PhCH}=\text{CBrCH}_3$, b. $\text{PhCH}=\text{CH}-\text{CH}_2\text{Br}$, c. $\text{PhCBr}=\text{CHCH}_3$
- Tertiary butyl carbocation was stabilized through:
i. hyperconjugation ii. inductive effect iii. Resonance effect,
- Which is correct about carbanion:
i. SP^2 hybridization ii. Is considered electrophile iii. Is considered nucleophile
- Methyl bromide reacts with $\text{CH}_3\text{CH}_2\text{ONa}/\text{CH}_3\text{CH}_2\text{OH}$ via :
i- $\text{S}_{\text{N}}1$ mechanism , ii- $\text{E}1$ mechanism , iii- $\text{S}_{\text{N}}2$ mechanism
- The IUPAC name of the following structure, $\text{CH}_3\text{CH}=\text{CHCHO}$ is:
a. Butanal b. butyraldehyde c. 2-butenal
- condensation of acetaldehyde in the presence of NaOH gave:
a. Butenoic acid b. Butanal c. Butenal.
- The most reactive alkyl halides towards $\text{S}_{\text{N}}2$ reaction condition is:
a. $\text{CH}_3\text{CH}_2\text{Br}$ b. CH_3Br c. $(\text{CH}_3)_3\text{C}-\text{Br}$
- Reaction of toluene with excess Cl_2 in the presence of sun light gave:
a. benzyl chloride b. mixture of o,p-chlorotoluene c. benzotrichloride
- oxidation of toluene using KMnO_4 yields:
a. benzoic acid b. phenyl acetic acid c. benzaldehyde
- Reaction of phenyldiazonium chloride with KCN produce:
a. Benzoic acid b. benzyl cyanide c. benzonitrile

22. Which of the following deactivating groups but o and p directors:

- a. NO₂ b. COOH c. Br

23. The IUPAC name of: CH₂=CHCH₂OH is

- a. allyl alcohol b. butanol c. vinyl alcohol

24. Heating glycerol with conc. H₂SO₄ produce:

- a. acrolein b. crotonaldehyde c. acrylic acid

25. Reaction of formaldehyde with acetone in the presence of NaOH give:

- a. crotonaldehyde b. acrolein c. methyl-vinyl ketone

Question 2: Choose the correct answer for the following questions..... (20 marks)

هذا السؤال خاص بأعمال السنة والأعمال الفصلية

1. the most acidic in the following

- a. CCl₃COOH CH₃COOH CH₂ClCOOH

2. The reaction of benzene with chlorine in the presence of sun light to give hexachlorocyclohexane was considered:

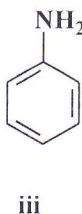
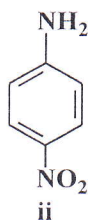
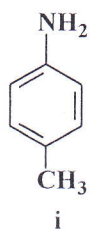
- a. Electrophelic addition b. Nucleophelic addition c. Free radical addition

3. Hydrolysis of the benzenesulfonic acids with dilute HCl at 150°C, under pressure, yield: a. phenol b. benzene c. diphenylsulfone.

4. Aromatic compounds mainly reacted according to:

- i. Nucleophilic substitution reaction ii. Electrophelic addition reactions
iii. Electrophelic substitution reactions

5. The most basic of the following amines is:



6. Inductive effect favored with

- a. σ-electrons , b. π-electrons , c. a and b

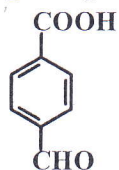
7. Which of the following may be classed as an electrophilic reagent?

- a. NH₃ , b. NH₄⁺ , c. CH₃OH

8. Allylic carbocation is stable intermediate by:

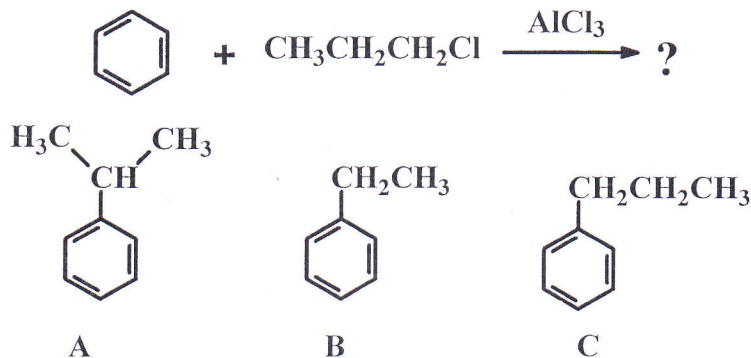
- a. inductive effect , b. hyperconjugation , c. resonance

9. What is the wrong name for the following compound:



- a. 4-formylbenzoic acid b. 4-carboxybenzaldehyde c. 4-acetylbenzoic acid

10. the major product of this reaction is:



Question 3: Put (✓) in the front of correct statement and (X) in the front of wrong statement:
.....(10 marks)

هذا السؤال خاص بدرجة الشفوى

1. Free radical carbon was considered as nucleophile.
2. Acetone was considered as aprotic solvent.
3. The rate of SN2 reaction mechanism doesn't affected with nucleophile (attacking group)
4. SN1 mechanism reaction prefer good nucleofug^e.
5. Hemolysis of bonds usually occurred in low temperature.
6. SN2 reaction Mechanism has two transition state.
7. Hydrolysis of vinyl chloride usually form acetaldehyde.
8. Acetaldehyde condensed in the presence of sodium hydroxide to for 2-butenal.
9. Crotonaldehyde can be presented in two forms cis and trans.
10. Formic acid more acidic than acetic acid.

5

A. M. Kamal El-Dean

Inorganic chemistry (1) (220 Chem.)

Answer the following questions:

(50 Marks)

A- Mark with (x) for the wrong statement or (√) for the correct statements of the following :

ملحوظة : يتم طمس (تسويد) الإجابة المختارة من قبل الطالب باستخدام القلم الجاف فقط

- 1- Lithium is higher in electronegativity than Flourine. ()
- 2- Reactivity of HBr is higher than HI. ()
- 3- Na_2CO_3 can be used on its own to make cakes. ()
- 4- Potassium salts conduct electricity more than Lithium salts. ()
- 5- Freons does not cause any damage to ozone layer. ()
- 6- Reaction of $\text{CaF}_2 + \text{HCl}$ is the preparation for HF. ()
- 7- Permanent hardness due to the presence of $\text{Mg}(\text{HCO}_3)_2$ or $\text{Ca}(\text{HCO}_3)_2$. ()
- 8- H_2S gas is poisonous due to the formation of the complex with hemoglobin in the blood. ()
- 9- Flourine is lower in reactivity than group (VII) elements. ()
- 10- Helium is diatomic. ()
- 11- The reaction of Hydrazine with chlorine depends on the amount of chlorine. ()
- 12- Pb (II) is more stable than Pb (IV). ()
- 13- Reaction of $\text{CaH}_2 + 2\text{H}_2\text{O}$ gives $\text{Ca}(\text{OH})_2 + 2\text{H}_2$. ()
- 14- Graphite conducts electricity more than Diamond. ()
- 15- Solubility of sodium salts is higher than calcium salts. ()
- 16- Heating of CaCO_3 gives $\text{CaO} + \text{CO}_2$. ()
- 17- Oxygen is never more than divalent. ()
- 18- Metallic character increases from Boron to Aluminium. ()
- 19- Boric acid acts as strong monobasic acid in presence of glycerol. ()
- 20- The reaction of $\text{HCOOH} + \text{HCl}$ is the preparation reaction for CO. ()
- 21- Cesium salts conducts electricity more than Lithium salts. ()
- 22- Carbon is limited to form a maximum of four covalent bonds. ()
- 23- HOCl is more acidic than HClO_4 . ()
- 24- Ozone can act as both reducing and oxidizing agent. ()

- 25- The Acidity of HCl is higher than HF. ()
- 26- The reaction of $8\text{NH}_3 + 3\text{Cl}_2$ gives $\text{N}_2 + 6\text{NH}_4\text{Cl}$. ()
- 27- The reaction $4\text{NH}_3 + 3\text{O}_2$ gives $2\text{N}_2 + 3\text{H}_2\text{O}$. ()
- 28- Reaction of $\text{Li}_3\text{N} + 3\text{H}_2\text{O}$ gives $3\text{LiOH} + \text{N}_2$. ()
- 29- Indium belongs to the halogen group. ()
- 30- In laboratory H_2O_2 can be prepared by the reaction of BaO_2 with HCl. ()
- 31- H_2O_2 can act as both reducing and oxidizing agent. ()
- 32- High electronegativity is one of the factors which influences complex formation. ()
- 33- Oxidation of NH_3 by NaOCl is the method of preparation of NH_2OH . ()
- 34- Reaction of $3\text{PbS} + 4\text{O}_3$ gives $\text{PbO} + \text{SO}_2$. ()
- 35- Heating of NH_4NO_3 gives $\text{N}_2\text{O} + 2\text{H}_2\text{O}$. ()
- 36- The reaction of $2\text{XeF}_2 + 2\text{H}_2\text{O}$ gives $2\text{Xe} + 4\text{HF} + \text{O}_2$. ()
- 37- Reaction of $\text{CaC}_2 + 2\text{H}_2\text{O}$ gives $\text{Ca}(\text{OH})_2 + \text{H}_2$. ()
- 38- Reaction of $\text{KNO}_3 + \text{H}_2\text{SO}_4$ gives $\text{KHSO}_4 + \text{HNO}_2$. ()
- 39- Reaction of $\text{Pb} + \text{NaNO}_3$ gives $\text{PbO} + \text{NaNO}_2$. ()
- 40 - The reaction of $2\text{NO} + \text{O}_2$ gives N_2O_4 . ()
- 41- The increasing tendency to form univalent compound of group (IIIA) on Descending the group is due to inert pair effect. ()
- 42- NH_4NO_2 gives $\text{NH}_3 + 2\text{H}_2\text{O}$ by heating. ()
- 43- $3\text{NH}_2\text{Cl} + 2\text{NH}_3$ gives $\text{N}_2 + 3\text{NH}_4\text{Cl}$. ()
- 44- Lithium is harder than Cesium. ()
- 45- Group II elements are better in forming complexes than Group I elements. ()
- 46- Reaction of $\text{H}_3\text{PO}_4 + \text{NaBr}$ is the usual laboratory preparation of HBr. ()
- 47- Reaction of $\text{Ba}(\text{NO}_2)_2 + \text{H}_2\text{SO}_4$ give $2\text{HNO}_3 + \text{BaSO}_4$. ()
- 48- Reaction of $\text{CaO} + 3\text{C}$ gives $\text{CO}_2 + \text{CaC}_2$. ()
- 49- Thermite reaction is the reaction of Aluminum and oxygen. ()
- 50- The reaction of $\text{NH}_4\text{Cl} + \text{NaOH}$ gives $\text{NH}_4\text{OH} + \text{H}_2\text{O} + \text{NaCl}$. ()

Answer the following questions (Midterm + Oral + Activity):

B - Mark with (x) for the wrong statement or (√) for the correct

statements of the following :

(50 Marks)

ملحوظة : يتم طمس (تسويد) الإجابة المختارة من قبل الطالب باستخدام القلم الجاف فقط

- 51- The mixture of CO and N₂ is called producer gas. ()
- 52- HF has low boiling point. ()
- 53- HF Can be handled in glass vessels. ()
- 54- Iodine exhibits oxidation numbers of (+III), (+V) and (+VII). ()
- 55- Melting point of diamond is high and the structure is harder than graphite. ()
- 56- Oxygen is the highest electronegative element in the periodic table. ()
- 57- CFC1₃, CF₂Cl₂, CF₃ Cl is the structure of urea. ()
- 58- Water gas is made by blowing air through red hot coke. ()
- 59- NH₂COONH₄ is the structure of Freon. ()
- 60- H₂O has higher boiling point than H₂S. ()
- 61- The reaction of XeF₂ + H₂ gives 2HF + Xe. ()
- 62- Xenon reacts with fluorine depending on the F₂/Xe ratio ().
- 63- The reaction of PbS + 4 H₂O₂ gives PbSO₄ + 4 H₂O. ()
- 64- Nitrogen can form pentahalide. ()
- 65- Cesium is harder than Potassium. ()
- 66- NH₄Cl gives NH₃ + HCl by heating. ()
- 67- Boron is a metal . ()
- 68- Cs is more reactive than Na. ()
- 69- Reaction of CH₄ + 2H₂O gives CO₂ + 4H₂. ()
- 70- The reaction of CCl₄ + 2HF is for the preparation of Freon. ()
- 71- KO₂ is used in space capsules to remove CO₂ and produce O₂. ()
- 72- Compounds formed by halogens and metals are covalent. ()
- 73- The reaction of 2BaO + O₂ gives 2BaO₂. ()
- 74- Helium can form clathrate compounds. ()
- 75- The reaction of Ca(HCO₃)₃ + Ca(OH)₂ gives 2CaCO₃ + 2H₂O . ()

"Good Luck "

Examiner

Prof Dr Dina M. Fouad

Final Exam for Computational Chemistry (C234)

Answer all the following questions:

(The exam is in **three** pages)

Question One: Choose the correct answer for each of the following: (final) (50 Marks)

1. The basis set 6-31+G contains polarised functions on
a) hydrogen atoms only b) non-hydrogen atoms only
c) hydrogen and non-hydrogen atoms d) no atoms
2. The basis set is triple zeta.
a) 3-21G* b) 6-311+G(d) c) 6-31+G(3df,3dp) d) 6-31G(d)
3. The basis set has diffuse functions for hydrogen atoms.
a) 6-31G(d) b) 6-311+G(d) c) 6-311+G(d,p) d) 6-31++G(d)
4. is not based on the HF method.
a) DFT b) CISD c) CCSD(T) d) All of the preceding
5. is the most accurate method in this group.
a) DFT b) CCSD(T) c) HF d) CCSD
6. is the fastest method in this group.
a) DFT b) CCSD c) MP2 d) CCSD(T)
7. A transition state has imaginary frequency/frequencies.
a) no b) one c) two d) more than one
8. The first derivative of with respect to reaction coordinates is zero.
a) transition states b) minima c) maxima d) all of the preceding
9. cannot be used to for modelling UV-Vis spectra.
a) HF b) Molecular mechanics c) DFT d) a and c
10. is appropriate for modelling multireference systems.
a) HF b) DFT c) CCSD(T) d) CASSCF
11. have no imaginary frequencies.
a) Reactants b) Products c) a and b d) Transition states

12. The approximation assumes that only electrons move, while nuclei are fixed.
 a) Born-Oppenheimer b) Slater c) Hartree d) Fock
13. A wave function must
 a) be antisymmetric b) conform to Pauli exclusion principle
 c) a and b d) neither a or b
14. suggested that the electron-electron repulsion in the Hamiltonian, which is the problem, is replaced with an effective field.
 a) Fock b) Hartree c) Slater d) Bohr
15. proposed writing the wave function as a Slater determinant.
 a) Fock b) Hartree c) Slater d) Max Born
16. In the Hartree-fock method, the wave function of the O_2 molecule is described by Slater determinant(s). (atomic number of $O = 8$.)
 a) 1 b) 2 c) 8 d) 16
17. The energy of will always be higher than the true energy.
 a) HF b) DFT c) CCSD(T) d) MP2
18. is appropriate for modelling chemical reactions.
 a) HF b) CIS c) CCSD d) All of the preceding
19. can be used for geometry optimization.
 a) HF b) DFT c) Molecular mechanics d) All of the preceding
20. is widely used to study biological processes and solid-state materials.
 a) HF b) DFT c) CCSD(T) d) Full-CI
21. basis sets are atom centred, which restricts their ability to model chemical bonds.
 a) Polarized b) Diffused c) Double zeta d) Minimal
22. basis sets are recommended for calculating dipole moments.
 a) Polarized b) Diffused c) Double zeta d) Minimal
23. describes the energy of electrons properly.
 a) Classical mechanics b) Quantum mechanics
 c) Relativity d) All of the preceding
24. A wavefunction of a molecule contains information about
 a) position of nuclei b) momentum c) total energy d) all of the preceding
25. An important limitation to DFT is
 a) high cost b) lack of electron correlation
 c) poor treatment of long range interactions d) all of the preceding

Question Two: Put **T** for true and **F** for false for the following: (Midterm+Oral) (50 Marks)

26. Conventional DFT methods are not appropriate for modelling non-covalent interactions.
27. CCSD has single and double excitations.
28. *Ab initio* methods rely on parameters from experiment.
29. CCSD is faster than DFT.
30. The force constant is the second energy derivative of the potential energy.
31. The solution of the Schrödinger equation for the hydrogen atom is the atomic orbitals:
1S, 2S, 2P,
32. HF is a single reference method.
33. Individual electrons are represented by different columns in the Slater determinant.
34. HF is appropriate for simulating bond dissociation.
35. Electron correlation is crucial for simulating chemical reactions.
36. Diffuse functions improve the flexibility of the basis set.
37. Polarization functions have very small exponents.
38. Diffuse functions are needed for long range interactions.
39. CIS is more accurate than CISD.
40. CCSD is less accurate than MP2.
41. HF methods are not appropriate for aromatic molecules.
42. Molecular mechanics simulates each atom as one particle.
43. DFT is more accurate than molecular mechanics.
44. Dispersion-corrected functionals should be used for binding energy.
45. Molecular mechanics relies on experimental parameters such as force constants and equilibrium values.
46. CISD has electron correlation.
47. Molecular mechanics is faster than DFT.
48. The wave function can be interpreted in terms of the location of the particle.
49. Post-HF methods lack electron correlation.
50. The main disadvantage of post-HF methods is the high cost.



Faculty of Science
Chemistry Department

Time: 2 and half hr
(Jun 2021)

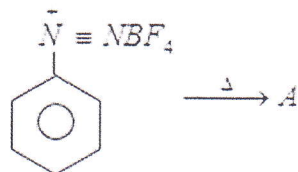
Final Examination for Applied Industrial Chemistry Students (Chem 202,
Organic Chemistry II)

Q1: Choose the correct answer a, b, c or d: (One mark each) (final): (50 Marks)

Section A (Aromatic Compounds)

(25 Marks)

1. In the below process what is the product A?

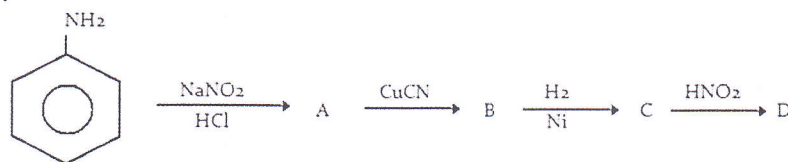


- a) Fluorobenzene
 - b) Benzene
 - c) 1, 4-difluorobenzene
 - d) 1, 3-difluorobenzene
2. Electrophilic substitution of aniline with bromine in presence of AlCl_3 gives which of the following?
- a) 1, 4, 6-Tribromo aniline
 - b) 2, 4, 6-Tribromo aniline
 - c) 4-Bromo aniline
 - d) 3-Bromo aniline
3. What is the name of the reaction of condensing aromatic halides and heating with copper-bronze at an elevated temperature forming biaryl:
- a) Ullmann Reaction
 - b) Sandmeyer's reaction
 - c) Perkin reaction
 - d) Schiemann reaction
4. What the reagent used in the Schiemann reaction to produce fluorobenzene:
- a) CuCl
 - b) H_2O and heat
 - c) KI and RT
 - d) HF and H_2O
5. The mechanism of heating chlorobenzene with NaOH above 300°C and affords phenol pass through:
- a) Elimination-addition
 - b) Formation of benzyne is a highly reactive, unstable intermediate
 - c) Nucleophilic aromatic substitution

- d) All the previous.
6. By treating diazonium salts with cuprous cyanide or KCN and copper powder it forms which of the following compound?
- Citric acid
 - Benzoic acid
 - Aryl nitrile
 - Oxalic acid
7. Which of the following is used as a reagent for conversion of m-dinitrobenzene to 2,6-dinitrophenol?
- $K_3Fe(CN)_6 / NaOH$
 - Conc. HNO_3
 - $Na_2Cr_2O_7 / H_2SO_4$
 - All the previous
8. Which combination of reagents used in the indicated order with benzene will give m-nitropropylbenzene?
- i) HNO_3 / H_2SO_4 , ii) $CH_3CH_2CH_2Cl / AlCl_3$
 - i) $CH_3CH_2CH_2Cl / AlCl_3$, ii) HNO_3 / H_2SO_4
 - i) $CH_3CH_2COCl / AlCl_3$, ii) HNO_3 / H_2SO_4 , iii) $H_2NNH_2 / NaOH$
 - i) HNO_3 / H_2SO_4 , ii) $CH_3CH_2COCl / AlCl_3$, iii) $H_2NNH_2 / NaOH$
9. Which of the following is used as a reagent for the nitration of o-nitro aniline to form o-dinitrobenzene?
- Caro's acid
 - H_2SO_5
 - Pertrifluoroacetic acid
 - All the previous
10. What is the major product obtained on interaction of phenol with sodium hydroxide and carbon dioxide?
- Benzoic acid
 - Salicylaldehyde
 - Salicylic acid
 - Phthalic acid
11. Which combination of reagents used in the indicated order with phenol will give picric acid?
- i) HNO_3 / H_2SO_4 , ii) $Na_2Cr_2O_7 / H_2SO_4$
 - i) Extra HNO_3 / H_2SO_4 , ii) HNO_3 / H_2SO_4
 - i) HNO_3 / H_2SO_4 , ii) $Na_2Cr_2O_7 / H_2SO_4$, iii) Heat/ H_2O , HNO_3
 - All the previous
12. In the series of reaction, what are X and Y are respectively?
- $$C_6H_5NH_2 \xrightarrow[0-5^\circ C]{NaNO_2/HCl} X \xrightarrow[CH_2O]{HNO_2} Y + N_2 + HCl$$
- $C_6H_5-N=N-C_6H_5$, $C_6H_5N^+_2Cl^-$

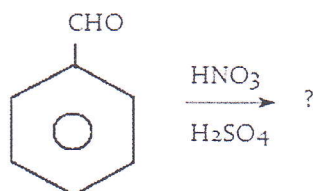
- b) $\text{C}_6\text{H}_5\text{N}_2^+\text{Cl}^-$, $\text{C}_6\text{H}_5\text{-N=N-C}_6\text{H}_5$
 c) $\text{C}_6\text{H}_5\text{N}_2^+\text{Cl}^-$, $\text{C}_6\text{H}_5\text{NO}_2$
 d) $\text{C}_6\text{H}_5\text{NO}_2$, C_6H_6

13. Aniline in a set of reactions yielded a product D. The structure of product D would be



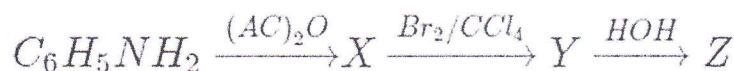
- a) $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$
 b) $\text{C}_6\text{H}_5\text{NHCH}_2\text{CH}_3$
 c) $\text{C}_6\text{H}_5\text{NHOH}$
 d) $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$

14. Predict the major product of the following reaction.



- a) o-Nitrobenzaldehyde and p-nitrobenzaldehyde
 b) m-Nitrobenzaldehyde
 c) o-Formylbenzenesulfonic acid and p-formylbenzenesulfonic acid
 d) m-Formylbenzenesulfonic acid

15. Identify the product Z in the following reaction.



- a) p-Bromoaniline
 b) p -Bromoacetophenone
 c) o-Bromoacetophenone
 d) o-Bromoacetanilide

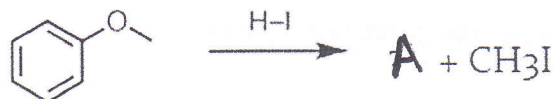
16. Benzene diazonium chloride when reacts with hypophosphorus acid produces which of the following compound?

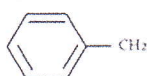
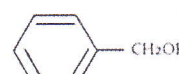
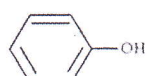
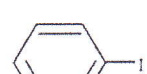
- a) Benzene
 b) Phenyl phosphate
 c) Phenol
 d) Phenyl isocyanide

17. Which reducing agent is used for the reduction of nitro compound to aniline?

- a) LiAlH_4
 b) Sn/HCl

- c) Na/alcohol
d) H_2/Ni
18. Reaction of aniline with benzaldehyde is which type of reaction?
a) Polymerisation
b) Condensation
c) Addition
d) Substitution
19. What of the following product is formed from oxidation of aniline with NaOCl ?
a) Indoaniline
b) p-Aminophenol
c) Azobenzene
d) p-Dinitrobenzene
20. Which of the following reagent is converted aniline to azobenzene?
a) $\text{PhI}/\text{Ac}_2\text{O}$
b) Cf_3COOOH
c) NaOCl
d) All the previous
21. What will be the product 'A' for the given reaction?



- a)  CIc1ccccc1
- b)  COc1ccccc1
- c)  Oc1ccccc1
- d)  Ic1ccccc1
22. Salicylaldehyde can be prepared from which of the following reactants?
a) Phenol and chloroform
b) Phenol, chloroform and sodium hydroxide
c) Phenol, carbon tetrachloride and NaOH
d) Phenol, carbon tetrachloride
23. Which of the following reagent give monobromination with phenol?
a) Water
b) 1,2-Dichloroethane
c) Cyclohexane
d) NaOH

24. Friedel-Crafts of phenol with acetyl chloride in absence of catalyze gave one of the following:

- a) o-Acetyl phenol
- b) o- and p-Acetyl phenol
- c) Methyl benzoate
- d) All the previous

25. What is the name of the reaction of allyl aryl ethers undergo rearrangement when heated gave alkyl phenol?

- a) Claisen rearrangement
- b) Sandmeyer's reaction
- c) Meerwein reaction
- d) Mannich reaction

Section B (Heterocyclic Chemistry)

(25 Marks)

I) Mark the correct answer with (✓) or (X) for the following sentences (13 Marks)

- 26. Isoxazole and isothiazole are basic heterocycles.
- 27. Quinoline and isoquinoline are not isomeric heterocycles.
- 28. Thiophene is not stable to Lewis acid.
- 29. Pyrimidines are not aromatic heterocycles.
- 30. 1,2-Azoles are more basic than 1,3-azoles.
- 31. 1,3- Azoles are reactive towards electrophilic attack.
- 32. Oxazole can be deprotonated at C2 position with BuLi.
- 33. Imidazole is more basic than oxazole or thiazole.
- 34. Thiophene is less aromatic than furan.
- 35. Indole easily undergoes electrophilic substitution at C3.
- 36. Pyrrole is reactive towards electrophilic substitution reaction
- 37. The aromaticity of thiophene is higher than Pyrrole.
- 38. Pyrrole is reactive than benzene toward electrophilic substitution reaction.

II) Choose the correct answer a, b, or c: (One mark each) (12 Marks)

- 39. Pyrrole reacts with CH_3MgI & CH_3I to give:
 - a) N-Methylpyrrole,
 - b) 2-Methylpyrrole
 - c) 3-Methylpyrrole
- 40. Indole reacts with Na followed by CH_3I to give:
 - a) N-Methylindole
 - b) 2-Methylindole
 - c) 3-Methylindole
- 41. Chlorination of indole takes place using:
 - a) HCl
 - b) Cl_2
 - c) SO_2Cl_2 by heating.

42. Pyrrole reacts with formaldehyde to give:
a) Pyrrole-2-aldehyde
b) Pyrrole-3-aldehyde
c) Dipyrromethane
43. Carbazole reacts with alkyl halide to give:
a) N-Alkylcarbazole
b) 2-Alkylcarbazole
c) 3-Alkylcarbazole
44. Nitration of furan by using:
a) HNO_3
b) $\text{HNO}_3/\text{H}_2\text{SO}_4$
c) ACONO_2
45. Furan reacts with Cl_2/Δ to give:
a) 2-Chlorofuran,
b) 2,5- Dichlorofuran,
c) 2,3,5- Trichlorofuran,
d) Mixture of all
46. Thiophene reacts with H_2SO_4 to give:
a) Thiophene-2-sulphonic acid,
b) Thiophene-3-sulphonic acid,
c) -Ve
47. Thiophene was nitrated by:
a) HNO_3 ,
b) $\text{HNO}_3/\text{H}_2\text{SO}_4$,
c) $\text{HNO}_3/\text{AcOH}/\text{AC}_2\text{O}$
48. 2-Acetylpyridine reacts with hydrogen to give:
a) 2-Ethylpyridine,
b) 3-Ethylpyridine,
c) Non
49. Quinoline reacts with HNO_3 to give:
a) 5- Nitroquinoline,
b) 8- Nitroquinoline,
c) Mixture of (a)+ (b)
50. Isoquinoline reacts with HNO_3 to give:
a) 5-Nitroisoquinoline
b) 8-Nitroisoquinoline,
c) Mixture of (a) + (b)

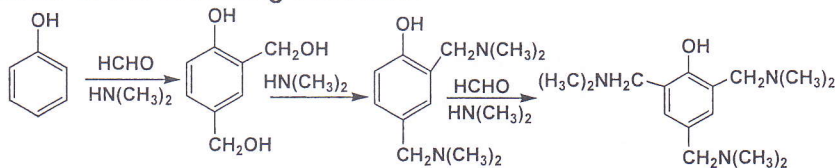
Q2: Choose the correct answer a, b, c or d: (One mark each) (Mid Term +

Oral): Aromatic Compounds

(15 Marks)

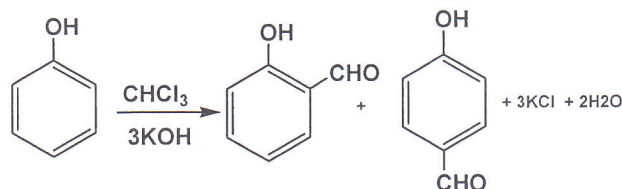
51. Replacement of diazo group by other groups is helpful in preparing those substituted aromatic compounds which cannot be prepared which type of reaction?

- a) Direct elimination
b) Addition reaction
c) Direct substitution
d) Replacement reaction
52. In the reaction, what is the compound $C_6H_5N=CHC_6H_5$ is known as?
 $C_6H_5CHO + C_6H_5NH_2 \rightarrow C_6H_5N=HCC_6H_5 + H_2O$
 a) Aldol
b) Schiff's reagent
c) Schiff's base
d) Benedict reagent
53. Among the following, which one is the strongest acidic?
 a) 2,4,6-Trinitrophenol
b) m-Nitrophenol
c) 2,4-Dinitrophenol
d) p-Nitrophenol
54. Nitroso amines ($R_2N-N=O$) are soluble in water. On heating them with concentrated H_2SO_4 they give secondary amines. What is this reaction called as?
 a) Perkin's reaction
b) Fittig's reaction
c) Sandmeyer's reaction
d) Liebermann's nitroso reaction
55. Which of the following is formed when phenol is exposed to air?
 a) o-Benzoquinone
b) p-Benzoquinone
c) Phenoquinone
d) o-and p-Benzoquinone
56. What is the name of the following reaction?



- a) Gattermanns reaction
b) Sandmeyers reaction
c) Meerwein reaction
d) Mannich reaction
57. n-Propylphenyl ether can be prepared from which of the following reactants?
 a) Phenol and n-propyl bromide
b) Sodium phenoxide and n-propenyl bromide
c) Sodium phenoxide and n-propyl bromide
d) phenol and n-propenyl bromide

58. What is the name of the following reaction?



- a) Claisen rearrangement
- b) Williamson reaction
- c) Reimer-Tiemann reaction
- d) Mannich reaction

59. Picric acid is formed when phenol react with which of the following reactant?

- a) Formaldehyde
- b) Hydrogen
- c) Nitric acid
- d) Hydrochloric acid

60. When react 2mole of Na and ethyl bromide with iodobenzene give one of the following:

- a) Toluene
- b) Ethylbenzene
- c) Biphenyl
- d) All the previous

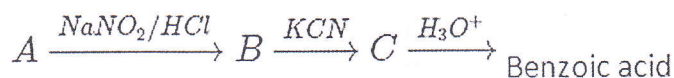
61. Among the following, which one is the strongest acidic?

- a) Phenol
- b) p-Nitrophenol
- c) p-Hydroxyphenol
- d) p-Chlorophenol

62. Sodium Phenolate reacts with CO_2 at high pressure to afford salicylic acid, this reaction called:

- a) Claisen rearrangement
- b) Mannish reaction
- c) Kolbe-Schmitt Reaction.
- d) Reimer-Tiemann reaction

63. Which of the following is compound A for following sequence of reaction gave benzoic acid ?



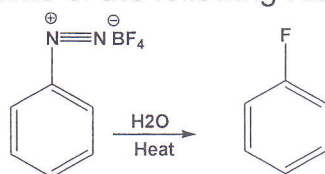
- a) Nitrobenzene
- b) Aniline

- c) Benzaldehyde
- d) Amides

64. What happens when benzene diazonium chloride is treated with potassium cyanide in presence of Cu powder?

- a) Benzophenone
- b) Methyl isocyanide
- c) Acetonitrile
- d) Benzonitrile

65. What is the name of the following reaction?



- a) Chlorination
- b) Sandmeyer's reaction
- c) Perkin reaction
- d) Schiemann reaction

Mark the correct answer with (✓) or (X) for the following sentences (15 Marks)

- 66. Pyrrole is important six membered ring heterocycles.
- 67. Reaction of ethyne and ammonia gave thiazole.
- 68. Distillation of succinamide with Zinc gave furan.
- 69. Pyrrole reacts with diazonium salt to give azo-dye.
- 70. Reiman-Tiemann reaction is used to introduce aldehyde group
- 71. N-Methylindole reacts with CH_3I to give 3-methylindole.
- 72. Reduction of carbazole with Na/amyl alcohol gave tetrahydrocarbazole.
- 73. Reaction of furic acid with $\text{CaO}/\text{NaOH}/\Delta$ gave furfural.
- 74. Reaction of Pyrrole with ethylnitrate gave 3-nitropyrrole.
- 75. Oxidation of furfural with NaClO_3 gave fumaric acid.
- 76. Heating phenol with pbo gave dibenzofuran.
- 77. Oxidation of picolines with KMnO_4 gave pyridine carboxylic acid.
- 78. Reaction of thiophene with acetyl chloride in SnCl_4 gave 3-acetyl thiophene.
- 79. Pyridine was fused with KOH to give 3-hydroxypyridine.
- 80. Nicotinc acid is a pyridine-2-carboxylic acid.

Best wishes

أ.د. على عبدالحافظ
أ.د. عبدالعال جابر



Final exam in 210 C course for second level's students

=====

Answer the following questions:

Section I : Final Exam.

(50 marks)

Q 1 : Shade the correct answer a,b,c or d:

1- Carbocation is :

a. intermediate , b. transition state , c. reactant

2- Mechanisms help us understand :

a. the conditions we must use to favor reactions only ,

b. the types of compounds form only , c. a and b

3- Which of the following is *not* a nucleophile?

a. CH_3OH , b. H_2 , c. CN^- , d. NH_3

4- Covalent bond may break in:

a. homolysis way only , b. heterolysis way only , c. a and b

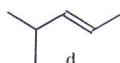
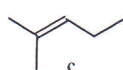
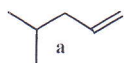
5- Carbanions estabilized by :

a. alkyl substituents , b. negative hyperconjugation , c. positive inductive effect

6- What type of solvent is best for $\text{S}_\text{N}2$ reaction:

a. polar protic solvent , b. polar aprotic solvent , c. nonpolar solvent .

7- The most stable of the following isomeric alkenes would be:



8- Reaction of HBr with propene in the presence of hydrogen peroxid considered :

a. nucleophilic addition reaction , b. electrophilic addition reaction

c. free radical addition reaction

9- Nucleophilic substitution reaction that proceed via $\text{S}_\text{N}2$ is :

a. stereospecific with inversion of configuration

b. stereospecific with retention of configuration , c. non stereospecific

10- Carbene exists in :

a. siglet state only , b. triplet state only , c. a and b

11- Hydrogen shift or methyl shift rearrangement was occurred during :

a. $\text{S}_\text{N}1$ mechanism , b. $\text{S}_\text{N}2$ mechanism , c. $\text{E}2$ mechanism

12- The presence of an intermediate can be determined by :

- a. chemical trapping , b. isolation , c. a and b

13- In which of the following mechanisms are alkenes the major reaction products ?

- a. E1 & S_N1 , b. E2 & S_N2 , c. S_N1 & S_N2 , d. E1 & E2

14- S_N1 reactions go faster with :

- a. H₂O as solvent , b. DMF as solvent , c. DMSO as solvent

15- The major product of the following reaction is :



- a. $(\text{CH}_3)_2\text{CHCH}=\text{CH}_2$, b. $(\text{CH}_3)_2\text{C}=\text{CHCH}_3$, c. $\text{CH}_2=\text{C}(\text{CH}_3)\text{CH}_2\text{CH}_3$

16- An inductive effect is :

- a. the displacement of electrons along a pi bond
b. the transfer of electrons from a pi bond to a sigma bond
c. the displacement of electrons along a sigma bond
d. the transfer of electrons across a benzene ring

17- Isotopes used to find out :

- a. type of intermediates , b. which bond is broken , c. type of the reagent (Nu⁻, E⁺)

18- The most basic of the following molecules is :

- a. CH₃.CONH₂ , b. CH₃.CH₂.NH₂ , c. (CH₃.CH₂)₂.NH , d. C₆H₅.NH₂

19- Which of the following compounds is optically active?

- a. CH₃.CH(OH).CH₃ , c. CH₃.CH(OCH₃).CH₃
b. CH₃.CH(OH).C₆H₅ , d. CH₃.CO.CH₃

20- Tertiary alkyl halides react with strong base via :

- a. E1/S_N1 mechanism , b. E1/S_N2 mechanism , c. E2/S_N1 mechanism

21- A tertiary carbocation is more stable than either a secondary or primary carbocation because :

- a. it carries three positive charges , c. it carries three negative charges
b. it is trigonal planar , d. it possesses three electron-donating groups

22- Which of the following substances favors S_N1 reaction:

- a. CH₃CH₂Br , b. CH₂=CHBr , c. H₂C=CHCHBrCH₃

23- Which of the following anions would be the best leaving group for a substitution or elimination ?

- a. H₃C⁻ , b. HO⁻ , c. Br⁻

24- Which of the following is not true about S_N1 mechanism ?

- a. multistep mechanism , b. has more than one transition state , c. kinetically second order

25- CH₃Br reacts with CH₃CH₂ONa / CH₃CH₂OH via :

- a- S_N1 mechanism , b- E1 mechanism , c- S_N2 mechanism , d- E2 mechanism

26- Which of the following carbonyl compounds most reactive toward nucleophiles:

- a. CH₃CHO , b. HCHO , c. CH₃CH₂CHO , d. CH₃COCH₃

17- Reduction of cyclopentenone using $\text{NaBH}_4/\text{Ethanol}$ yields:

- a. cyclopentenol , b. cyclopentanol , c. cyclopentane , d. cyclopentanone

28- Reaction of CH_3MgBr with CH_3CHO followed by H_3O^+ work up :

- a. 2-propanol , b. 1-propanol , c. n-butanol , d. tertiary butanol

29- The name of the structure shown below is :



- a. 3-chlorobutanal , b. 3-chlorobutanamide ,
c. 3-chlorobutanoic acid , d. 2-chloropropanoic acid

30- Hydration of propyne using $\text{dil. H}_2\text{SO}_4 / \text{HgSO}_4$ gives ;

- a. propanone , b. propanal , c. 2-butanone , d. butanal

31- Oxidation of PhCH_2OH using H_2CrO_4 yields :

- a. PhCH_2COOH , b. PhCHO c. PhCOOH , d. PhCH_2CHO

32- The reaction of the anion of 1,3-dithiane with $\text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$ followed by $\text{HCl} / \text{HgCl}_2$ work up yields:

- a. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$, b. $\text{CH}_3\text{COCH}_2\text{CH}_3$, c. $\text{CH}_3\text{CH}_2\text{CHO}$, d. CH_3COCH_3

33- Choose the product obtained from the following reaction



- a. $\text{PhCOCH}_2\text{CH}_3$, b. PhCOCH_3 , c. PhCOOLi , d. $\text{PhCOCH}_2\text{CH}_2\text{CH}_3$

34- Reduction of RCOCl to RCHO by H_2 catalyzed by Pd/BaSO_4 , the reaction name is :

- a. Claisen , b. Clemmensen , c. Wolf-Kischner , d. Rosenmund reaction

35- Choose the product that obtained from the following reaction



- a. $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$, b. $\text{CH}_3\text{CH}_2\text{CHO}$, c. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$, d. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$

36- Reaction of CH_3CN with CH_3MgBr followed by H_3O^+ work up yields ;

- a. $\text{CH}_3\text{CH}_2\text{CHO}$, b. CH_3COCH_3 c. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$, d. $\text{CH}_3\text{COCH}_2\text{CH}_3$

37- Which of the following reagents when reacts with benzene gives $\text{PhCOCH}_2\text{CH}_3$:

- a. $\text{CH}_3\text{COCl} / \text{AlCl}_3$, b. CH_3COCl alone , c. $\text{CH}_3\text{CH}_2\text{COCl} / \text{AlCl}_3$, d. $\text{CH}_3\text{CH}_2\text{COCl}$ alone

38- Reaction of RCHO with ethylene glycol in acidic medium, the general name of the products are :

- a. cyclic ketals , b. cyclic acetals , c. acetals , d. ketals

39- Choose the best reducing agent that convert cycloheptanone to cycloheptane ;

- a. LiAlH_4 , b. NaBH_4 , c. H_2 / Ni , d. $\text{Zn(Hg)} / \text{HCl}$

40- Reaction of aldehydes or ketones with α -CH with secondary amines / acidic medium, the general name of the products are :

- a. enamines , b. hydrazones , c. oximes , d. semicarbazones

41- Which of the following is oxidizing agent :

- a. LiAlH_4 , b. NaBH_4 , c. Ag_2O , d. DiBAL-H

42- What the product that obtained from the following reaction :



- a. butanoic acid , b. propanoic acid , c. pentanoic acid , d. ethanoic acid

43- Reaction of sodium salt of diethyl malonate with CH_3Br followed by HCl/heat , the product is:

- a. propanoic acid , b. butanoic acid , c. ethanoic acid , d. pentanoic acid

44- Which of the following compounds upon treatment with NaOH at room temperature or below yields 3-hydroxybutanal:

- a. ethanal , b. propanal , c. propanone , d. butanal

45- Which of the following acids when reacts with $\text{EtOH/acidic medium}$ yields ethyl acetate:

- a. propanoic acid , b. pentanoic acid , c. butanoic acid , d. ethanoic acid

46- Hydration of acrylic acid using $\text{dil. H}_2\text{SO}_4$ to yields 3-hydroxy propanoic acid, the reaction classified as ;

- a. electrophilic addition , b. nucleophilic addition , d. free radical addition reaction

47- Which of the following bases can deprotonated simple esters to enolate ion :

- a. EtONa / EtOH , b. MeONa / MeOH , c. KOH , d. LDA

48- Which of the following reagents can convert RCOCl to RCOOH :

- a. NH_3 , b. RNH_2 , c. H_2O , d. R_2CuLi

49- Reaction of CH_3CHO and HCHO over sodium silicate yields :

- a. 2-butenal , b. pent-3-en-2-one , c. propenal

50- Which of the following is the least nucleophilic reagent:

- a. OH^- , b. H_2O , c. CH_3COO^- , d. CH_3S^-

Section II : Oral and Midterm Exams.

Q 2 : Shade (T) for True statements or (F) for False statements

(30 marks)

51- A transition state is the lowest energy species in the reaction steps.

52- Nucleofuge is a leaving group which departs with its bonding pair of electrons following heterolysis.

53- Hyperconjugation is the localization of electron density *via* overlap of a bonding orbital with an empty p orbital on an adjacent atom.

54- Chemoselectivity is defined as which functional group will react.

55- An elimination reaction is one where starting material loses the elements of a small molecule.

- 56- $\text{CBr}_2=\text{CF}_2$ can exist as cis and trans isomers .
- 57- The reaction between propene and HBr is an electrophilic addition , giving 2-bromopropane as the major product . .
- 58- Markowinkoff's rule is observed only when an unsymmetrical alkene react with an unsymmetrical reagent .
- 59- Each individual step of a complex reaction that is called an elementary reaction.
- 60- Organic reaction that take place in more than one step involve the formation of an intermediate .
- 61- Curved arrows use to indicate the movement of pairs of electrons of the covalent bond.
- 62- Electrophilic reagents are electron loving species.
- 63- The rate determining step is the slowest elementary step in a mechanism.
- 64- Free radical is sp^2 hybridized with vacant p orbital.
- 65- Benzyne is a neutral aromatic intermediate.
- 66- Acetals are stable towards acids.
- 67- RCOCl reacts with $2\text{eq. R}'\text{-MgX}$ followed by H_3O^+ work up to produce secondary alcohols.
- 68- Water adds to aldehydes and ketones in acidic medium to give geminal diol.
- 69- Cyclohexanone reacts with excess alcohol in acidic medium to affords acetals.
- 70- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$ can form enamines.
- 71- Acetone reduction using $\text{NaBH}_4 / \text{EtOH}$ affords n-propanol.
- 72- The addition of phosphorous yields to carbonyl compounds gives alcohols.
- 73- According to IUPAC name CH_3COOH named ethanoic acid.
- 74- Partial hydrolysis of RCN using NaOH gives RCONH_2 .
- 75- β -Dicarbonyl compounds have a carbon with two carbonyls attached to it.
- 76- Mixed Claisen condensation are carried out with one α -hydrogen and one with no α -hydrogen.
- 77- Acids react with acid chloride to give esters.
- 78- Oxidation of allyl alcohol using MnO_2 yields acrylic acid.
- 79- RCN reducing by DiBAL-H in toluene at -78°C to produce RCHO .
- 80- Self condensation of ethyl acetate in $\text{EtONa} / \text{EtOH}$ gives ethyl acetoacetate.

انتهت الاسئلة

اجمل الامنيات بالتوفيق

اد. اميمة سعد الطوخي

اد. شعبان محمد رضوان



22, June 2021

Faculty of Science

Chemistry Department

Time allowed: 2 hours

Final Examination of Industrial Method of Analysis

For 2nd Level Students (C – 205)

.....
Answer the following two questions :

(80 degrees)

Section (A) : Final Examination

(50 degrees)

Q1 – Choose the correct answers:

(3 x 6 = 18 degrees)

- 1- The representation of Beer's law is given as $A = a b c$. If (b) represents distance, (c) represents concentration, and (A) represents absorption, what does (a) represent?
a) Intensity b) Transmittance c) Absorptivity d) Admittance
- 2- What is the Unit of molar absorptivity which is used to determine absorbance A in Beer's Lambert's formula ?
a) $L \text{ mol}^{-1} \text{ cm}^{-1}$ b) $L \text{ gm}^{-1} \text{ cm}^{-1}$ c) cm d) no Unit
- 3- Beer's Lambert's law gives the relation between which of the following :
a) Reflected radiation and concentration
b) Scattered radiation and concentration
c) Energy absorption and concentration
d) Energy absorption and reflected radiation
- 4- Hydrogen electrode which is the reference electrode can be used as which of the following ?
a) Anode only b) cathode only c) Anode or cathode d) salt bridge
- 5- Why is standard hydrogen electrode called as the primary reference electrode ?
a) It has a known output potential
b) It has a constant output potential
c) Its output potential is independent of a composition of the solution
d) Its output potential is zero volt
- 6- In which of the following ways, absorption is related to transmittance ?
a) Absorption is the logarithm of transmittance
b) Absorption is the reciprocal of the transmittance
c) Absorption is the negative logarithm of transmittance
d) Absorption is a multiple of transmittance

Q2 - Write (true) or (false) in front of the following statements : (3x 6 = 18 degrees)

- 1- Galvanic cell is a chemical reaction occurs spontaneously to produce electric energy ()
- 2- Electrode potential is a measure of the tendency of a half reaction to loss or gain electrons. ()
- 3- Salt bridge allow charge to transfer and to help mixing of solutions. ()
- 4- Bathochromic shifts is the spectrum which go to shorter wavelength. ()
- 5- Auxochrome is the group which does not absorb by radiation ~~by~~ itself ,but its presence in the molecule may change the position and or the intensity of absorption ()
- 6- Stokes shift is a difference in wavelength between the radiation used to excited fluorescence and wavelength of the emitted radiation ()

Q3 – What is the significance of the plot the photometric titration of p- nitrophenol and m- nitrophenol with NaOH (sketch the plot). **(4 degrees)**

Q4 - A glass electrode – saturated calomel electrode (SCE) pair is calibrated at 25°C with a pH = 4.01 standard buffer. The measured voltage is 0.814 volt. Calculate the pH of an unknown solution for which the potential reading is 0.209 volt. **(5 degrees)**

Q 5 – A 7.5×10^{-5} M solution of KMnO_4 has a transmittance of 36.4 % , when measured in a 1.05 cm cell at a wavelength of 525 nm. Calculate: (a) The absorption of this solution .
(b) The molar absorptivity of KMnO_4 **(5 degrees)**

Section (B) : Mid term , Activity , Oral (30 degrees)

Q1 - Write (true) or (false) in front of the following statements : (3 x7 = 21 degrees)

- 1- Fluorescence is a process by which an excited atom relaxes by emitting electromagnetic radiation. ()
- 2- In UV/Visible if the concentration by gm /L it called absorptivity ()
- 3- Electrodes of the second type is $\text{M} / \text{M}^+ / \text{X}^-$ where (MX) is a slightly soluble salt ()
- 4- Redox electrodes is an inert metal in contact with a solution of the oxidized and reduced form of a half reaction. ()
- 5- Vibrational relaxation depicted by the short wavy arrows between vibrational levels ()
- 6- Electrolytic cell is a chemical reaction occurs spontaneously to produce electric energy..... ()
- 7- Nonreactive relaxation which is sometimes called internal conversion ()

Q2 – From the half reaction cell , write the galvanic cell , reaction of the cell , and calculate cell potential ?



(3 degrees)

Q3 – Discuss the applications of UV/ Vis spectrophotometric technique for determination of metal ion complex.
(3 degrees)

Q5 - The molar absorptivity of the complex formed between Bi^{3+} and thiourea is $9.32 \times 10^3 \text{ L mol}^{-1} \text{cm}^{-1}$ at 470 nm. Calculate the range of permissible concentrations for the complex, if the absorbance is to be no less than 0.15 nor greater than 0.80 when measurements are made in 1.0 cm cell.
(3 degrees)

Page 3 of 3

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Good Luck

Examiner : Prof. Dr. Elham Y. Hashem

Assiut University
Faculty of Science
Chemistry Department

Time allowed: 3hrs
June 2021-06-02

Physical Chemistry Examination 230C

Final Examination

Q1. Choose the correct Answer A,B,C or D (one mark each)

- 1- The work done in constant volume processes is
a- positive b- negative c- zero d- equal to ΔE
- 2- The internal energy in isothermal processes
a- increases b- decreases c- is constant d- is equal to W
- 3- In adiabatic processes the amount of heat is
a- positive b- negative c- zero d- equal to ΔH
- 4- The temperature in an adiabatic expansion process
a- increases b- does not change c- decreases d- is equal to zero
- 5- The molar heat capacity is expressed in
a- $\text{cal gm}^{-1} \text{K}^{-1}$ b- $\text{cal mol}^{-1} \text{K}$ c- $\text{cal mol}^{-1} \text{K}^{-1}$ d- cal mol
- 6- Entropy change in expansion processes
a- increases b- decreases c- is constant d- is maximum
- 7- In isothermal expansion processes, the pressure
a- increases b- decreases c- still not changed d- is equal to zero.
- 8- The entropy change of evaporation processes is
a- positive b- negative c- zero d- minimum
- 9- The heat content in exothermic reactions
a- increases b- decreases c- does not change d- is equal to C_p
- 10- The relation between C_p and C_v for a gas is
a- $C_p = C_v$ b- $C_v > C_p$ c- $C_p > C_v$ d- $C_p - C_v = R$
- 11- The number of steps in Carnot cycle is
a- Two b- Four c- Three d- Five
- 12- The relation between ΔH and ΔE for reactions between solids
a- $\Delta H > \Delta E$ b- $\Delta E > \Delta H$ c- $\Delta H = \Delta E$ d- $\Delta H = \Delta E = 0$
- 13- The temperature of the system decreases in
a- adiabatic expansion b- adiabatic compression c- isothermal expansion d- isothermal compression
- 14- The amount of heat taken in an adiabatic processes is
a- positive b- zero c- negative d- equal to W
- 15- Adiabatic expansion processes are accompanied by temperature

a-increases d-decreases c-not changed d-is equal to Zero

16- The first law expression for adiabatic processes is
a- $\Delta E = q$ b- $q = w$ c- $\Delta E = -w$ d- $q - w = 0$

17- ΔH of any process can be equated to
a- $C_v \Delta T$ b- $(q - C_v) \Delta T$ c- $C_p \Delta T$ d- $(C_p + C_v) \Delta T$

18- The half life for the second order reactions is equal to
a- $1/k_2 a$ b- k_2 c- $1/k_2$ d- $2k_1 a$

19- The half life for the third order reactions is equal to
a- $2 K_3 a$ b- $3 K_3 a$ c- $3/2 K_3 a^2$ d- $K_3 C$

20- The inversion of can sugar is an example for the
a-second order b-first order c-third order d-opposing reactions

21- The specific rate constant of bimolecular reactions should be given by the following equation :
a- $K = Zq$ b- $K = TW$ c- $K = VW$ d- $K = PRT$

22- The decomposition of hydrogen peroxide is an example for the
a-first order reaction b-second order reaction c-third order reaction
d-zero order reaction

23- The kinetic combination of hydrogen and bromine to form hydrogen bromide is an example for
a-chain reactions b-opposing reactions c-hydrolysis reactions
d-consecutive reactions

24- The K value for the first order is expressed in
a- sec^{-1} b- mol sec^{-1} c- gm sec^{-1} d- $\text{mol}^{-1}/\text{liter}$

25- Hydrolysis of an ester in mineral acid is an example for
a-second order reactions b-first order reactions c-opposing reactions
d-side reactions

Q2 Answer the following statements with TRUE (T) or FALSE (F)
(one mark each)

26- The work done in constant volume processes is positive.

27- The entropy is inversely proportional with temperature.

28- The internal energy change in isothermal processes increases.

29- In adiabatic processes the amount of heat taken or lost by the system is zero.

30- The entropy in expansion processes increases.

31- The enthalpy change in isothermal processes decreases.

32- The work done in adiabatic expansion process increases the internal energy of the system.

33- Exothermic reactions are accompanied by increase in its enthalpy.

34- The entropy change in melting process is negative .

35- Isolated expansion of a gas is accompanied by entropy increase.

- 36- In adiabatic processes the pressure increases with increasing the volume
- 37- The heat capacity of a gas at constant volume is equal to that at constant pressure.
- 38-Endothermic reactions are accompanied by increase in its heat content.
- 39- If there are no change in number of moles of gaseous phases in chemical reactions both the enthalpy and internal changes are equal.
- 40- Carnot cycle consists of only three consecutive steps.
- 41- Efficiency of heat engine depends only on the two working temperatures.
- 42- The molar heat capacity is expressed in $\text{cal mol}^{-1}\text{K}^{-1}$.
- 43- Plotting $\log a-x$ versus t gives a straight line whose slope is equal to $-k_1/2.303$
- 44- Plotting $1/(a-x)$ versus t gives a straight line whose slope is equal to $2k_2$.
- 45- Plotting $1(a-x)^2$ versus t gives a straight line whose slope is equal to $2K_3$.
- 46- Consecutive reactions proceed from reactants to produce through one or more intermediate stages.
- 47- The theory of absolute reaction rate postulates that molecules before undergoing a reaction must form an activated complex in equilibrium with the reactants.
- 48- Plotting $\log K$ against $1/T$ gives a straight line of slope $-\Delta E_a / 2.303R$.
- 49- The combination of hydrogen and brome to form hydrogen bromide is an example for chain reactions.
- 50- The half life period for the first order is equal to $1/K_2a$.

Mid Term + Oral + Activity Examination

Q3 Choose the correct Answer A,B,C or D (one mark each)

- 51-Standard heat of formation of any element is
a-positive b- negative c-zero d- equal to ΔE
- 52-The heat of formation of a compound is expressed in
a-cal /gm b-cal.gm c-cal mol^{-1} d-cal gm^{-1}
- 53-compounds which have negative value of ΔH_f^0 are
a-not stable b-stable c-meta stable d- reversible.

54-The entropy upon increasing the volume
a-decreases b-increases c-is constant d-is equal to zero

55-In melting processes entropy
a-decreases b-increases c-not changed d-is equal to zero

56-The work done in adiabatic expansion is equal to
a- ΔE b- $-\Delta E$ c- ΔH d- R

57-The work done in irreversible processes is
a-minimum b-maximum c-zero d-larger than reversible ones.

58-In the reaction $H_2 + I_2 \rightleftharpoons 2HI$
a- $\Delta E = 0$ b- $\Delta E = \Delta H$ c- $\Delta H > \Delta E$ d- $\Delta E > \Delta H$.

59-The entropy of a gas at any increase in temperature
a-decreases b-increases c-does not change d-is equal to zero

60-In the reaction $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$
a- $\Delta E = \Delta H$ b- $\Delta E = \Delta H = 0$ c- $\Delta E > \Delta H$ d- $\Delta H > \Delta E$

61- The first law expression in isothermal process is
a- $\Delta E = W$ b- $\Delta H = \Delta E$ c- $\Delta E = q$ d- $q = W$

62-For the reaction $H_2 + I_2 \rightleftharpoons 2HI$ $\Delta H = 12.4$ Kcal. Therefore the heat of formation of HI
a-12.4 b- 12 c-6.2 d- -6.2 Kcal

63- The reaction $2CO + O_2 \rightleftharpoons 2CO_2$ is carried out in closed vessel the relation between ΔH and ΔE would be
a- $\Delta H = \Delta E$ b- $\Delta H > \Delta E$ c- $\Delta E > \Delta H$ d- $\Delta E = \Delta H = 0$

64-The half life for the first order is equal to
a- $1/k_3a$ b- $0.694/k_1a$ c- $0.692/k_2a$ d- $0.693/k_1$

65- For the following second order the reaction ($2A \rightleftharpoons \text{products}$), the rate should be proportional to
a- $2C_A^2$ b- $3C_A$ c- C_A^2 d- $2C_A$

66-For the first order reaction, n is equal to
a-2.2 b-2.1 c-1.45 d-1.0

67-Plotting $\log k$ against $1/T$ gives a straight line of slope
a- $\Delta E/RT$ b- $\Delta E/R$ c- $-\Delta E_a/2.303R$ d- $\Delta F/2.3R$

68-For the opposing reactions the rate constant is equal to
a- $2.3 \log m/m-x = (k_1 + k_1') t$ b- $\ln m/m = k_1(t)$ c- $\ln m/m-x$
d- $\ln m/m-1$

69-For the third order reaction
a- $n=3.5$ b- $n=3.0$ c- $n=2.33$ d- $n=2.45$

70-To determine the order of the reaction by half life change method

The n can be calculated by the using the following equation
 $a-t_1/t_2=(a_1/a_2)^n$ $b-t_1/t_2=(a_2/a_1)^n$ $c-t_1/t_2=(a_1/a_2)^{n-1}$
 $d-t_1/t_2=(a_2/a_1)^{n-1}$

71-For the following second order reaction ($A+B\rightarrow\text{products}$) the rate is proportional to
 a- C_A^2 b- C_B^3 c- $C_A C_B$ d- $C_A^2 C_B^1$

72-Plotting $1/(a-x)^2$ versus t gives a straight line whose slope is
 a- $2k_3$ b- $2k_2$ c- $2.3/k_2$ d- $3k_3$

73-Plotting $1/(a-x)$ against t give a straight line whose intercept is
 a- $1/a^3$ b- $1/a$ c- $1/a^2$ d- $1/a^4$

74-The rate constant for the first order reaction ($A\rightarrow\text{products}$) is equal to
 a- $K_1=2.303/t \log a/a-x$ b- $K_1=a/a-x$ c- $K_1=2.3/t$ d- $K_1=a/2.3$

75-Plotting $1/(a-x)^2$ against t gives a straight line whose the intercept
 a- $1/a^3$ b- $1/a$ c- $1/a^2$ d- $1/a^4$

Q4. Answer the following statements with TRUE (T) or False(F)

76-Stable compounds have positive heat of formation.

77-Reactions that are accompanied by change in number of moles its gaseous components have $\Delta H > \Delta E$

78-Reaction that accompanied by change in its heat capacity its ΔH depends on its temperature .

79-In adiabatic processes $\Delta H = q_p$

80-Isothermal expansions of gases are those carried out at constant pressure

81-Heat engine transforms completely the amount of heat taken into work

82-Work done in reversible processes is generally higher than in irreversible ones

83-Reaction carried out in closed vessels, the amount of heat taken is equal to its enthalpy change.

84-The product of pressure and volume in any adiabatic processes is constant

85-knowing the heat of formation of both reactants and products in a given reaction helps to calculate the enthalpy change of the reaction

86-The amount of heat taken at constant pressures can be equated to its enthalpy change.

87-The internal energy function is a state function

- 88-In absence of any opposing pressure on any system the work done on any process is positive .
- 89-Efficiency of any heat engine can be equated to 100 %.
- 90-The amount of heat and the work done in any process are state functions.
- 91-Adiabatic processes are accompanied by temperature change.
- 92-The half life period for the second order is equal to $0.69/K_1$
- 93-The half life period for the third order is equal to $3/2k_3$
- 94-For the following second order reaction $2A \rightarrow \text{products}$, the rate is proportional to C_A^3
- 95-For the following third reaction $3A \rightarrow \text{products}$, the rate is proportional to C_A^3
- 96-For the first order reaction $n= 2$
- 97-Plotting $\log k$ against $1/T$ gives a straight line of slope = ΔE
- 98-When two values of k are available at two temperatures ΔE^* may be evaluated.
- 99-Hydrolysis of an ester by alkali with concentrations of the base and ester of 0.02 mole /liter is an example of first order reaction
- 100-The decomposition of sodium hypochlorite in aqueous solution is an example of consecutive reactions.

Good Luck
Prof. Y. Temerk Prof. R. Gabr



Final Exam. of Physical and Inorganic Chemistry (250 - CH)

Section I (Inorganic Chemistry)

(40 Marks)

(1) Choose the Correct Answer

(25 Mark)

1. Calcium hydroxide is often used to detect:
a) NO_2 b) CO_2 c) SO_2 d) SO_3
2. Calcium reacts with cold water liberating:
a) N_2 b) O_2 c) H_2 d) Cl_2
3. The electronic configuration for the halogens is:
a) $n\text{S}^1 n\text{P}^6$ b) $n\text{S}^2 n\text{P}^5$ c) $n\text{S}^2 n\text{P}^6$ d) $n\text{S}^2 n\text{P}^4$
4. Which of the following hydroxides is most basic?
a) $\text{Be}(\text{OH})_2$ b) $\text{Ca}(\text{OH})_2$ c) $\text{Al}(\text{OH})_3$ d) $\text{B}(\text{OH})_3$
5. Which of the following oxide is most basic?
a) Li_2O b) Na_2O c) Cs_2O d) K_2O
6. HBr acid is prepared by reaction of NaBr with:
a) H_2SO_4 b) H_3PO_4 c) HNO_3 d) HCl
7. Water gas is a mixture of CO and
a) H_2 b) N_2 c) O_2 d) NO
8. The compound which contains a high oxidation state of sulfur is:
a) S b) SO_2 c) SO_3 d) SO
9. Which one of the following species contains an odd number of electrons?
a) CO b) NH_4^+ c) NO d) CO_2
10. The species which contains paramagnetic is:
a) NO b) CO c) N_2 d) CN^-
11. The compound which contains hydrogen bond:
a) CH_4 b) H_2S c) HF d) H_2
12. Which solution of the following reagents gives a precipitate when CO_2 is bubbled into it:
a) KOH b) NaOH c) $\text{Ba}(\text{OH})_2$ d) $\text{Al}(\text{OH})_3$
13. An element X from gr(I) reacts with Y from gr(VII) to form a compound:
a) X_2Y b) XY c) XY_2 d) X_3Y
14. The greatest acid strength in water is:
a) HClO_2 b) HClO c) HClO_4 d) HClO_3
15. An element X combines with oxygen to form an oxide XO , to which group does it belong?
a) gr(I) b) gr(II) c) gr(III) d) gr(IV)
16. The greatest acid strength in water is:
a) HIO b) HClO c) HBrO d) HF

See Next Page

17. The external electronic configuration for inert gases is:
a) nS^1nP^6 b) nS^2nP^5 c) nS^2nP^6 d) nS^2nP^4
18. Boron forms three covalent bond using hybrid orbitals:
a) SP b) SP^2 c) SP^3 d) S^2P
19. All hydrides of gr(VI) are poisonous gases except:
a) H_2S b) H_2O c) H_2Se d) CaH_2
20. Which one of these salts gives an alkaline solution in water?
a) KOH b) KCl c) KBr d) KNO_3
21. An element X from gr (III) reacts with Y from gr(VI) to form a compound:
a) X_2Y b) X_2Y_3 c) XY_2 d) X_3Y_2
22. Element X forms XO_2 with oxygen, the element is:
a) Na b) Mg c) C d) Al
23. Which of the following oxide is most acidic?
a) Li_2O b) SO_2 c) Cs_2O d) CO_2
24. The solutions of hydrogen halides are not corrosive except:
a) HI b) HCl c) HBr d) HF
25. The (+I) oxidation state is stable of the element: a) Al b) Tl c) B d) C

Mid. Term + Oral + Activity

(II) Are the following statements True (✓) or False (X).

(15Mark)

1. PCl_5 is not known but NCl_5 is known. ()
2. Na_2CO_3 is soluble in water but $CaCO_3$ is not ()
3. NH_3 is quite poisonous gas ()
4. $TiCl_3$ used as reducing agent ()
5. Graphite and diamond have the same structure. ()
6. In aqueous solution, H_3BO_3 behaves as Lewis acid. ()
7. $Ca_3(PO_4)_2$ is major mineral present in phosphate rock. ()
8. Oxygen is never more than divalent. ()
9. BF_3 is commercially important as a catalyst. ()
10. Superphosphate is manufactured by reaction of rock phosphate with sulfuric acid. ()
11. Water hardness is a measure of Na^+ and K^+ ()
12. Tritium has one proton and one neutron. ()
13. H_3PO_3 used as oxidizing agent. ()
14. CFCs are a good effect in environment ()
15. In pure water beryllium salts are acidic ()

See Next Section II

Section III: Mid-Ter Question: (B): Tab;e 2

(Mark: 10)

Choose True (T) or False (F) in the folloewng:

26) In Adiabatic expansion of an ideal gas $PV^\gamma = 0.00$.27) In Adiabatic expansion of an ideal gas $PV^\gamma = \text{Const}$.

28) $dS = \frac{dq_{rev}}{dH}$

29) $dS = \frac{dq_{rev}}{dH}$

30) $dS = \frac{dq_{rev}}{T}$

31) $dq = nC_p dT$

32) $dq = nC_p dH$

33) $dS = \frac{nC_p}{T} dT$

34) $dS = \frac{nC_p}{H} dT$

35) $dS = nC_p \ln \frac{T_2}{T_1}$

Section IV: Oral Question: (B) Choose the True (T) or False (F)

(Mark: 5)

36) In Carnot cycle, the efficiency' $\eta_{\%} = 50$, if $T_2 = 2T_1$.37) In Carnot cycle, the efficiency' $\eta_{\%} = \infty$, if: $T_2 = 00$.38) In Carnot cycle, the efficiency' $\eta_{\%} = -50$, if: $T_2 = 00$.39) In Carnot cycle, the efficiency' $\eta_{\%} = -50$, if: $T_2 = 2T_1$.40) In Carnot cycle, the efficiency' $\eta_{\%} = -100$, if: $T_1 = 2T_2$.Good Luck

Examiners: Prof. Dr. Amna S A Zidan,

Prof. Dr. Seddique M Ahme

Table 1

<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>
<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>					

Table 2

<u>26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>

Table 3

<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>

Choose the correct answer Answer the following questions

(Marks:25)

- 1) $T = t + \dots$, a) 173, b) 273 c) 00 d) 373
- 2) $\Delta H = \dots$ a) q_V b) q_P c) q_F d) q_H
- 3) $\Delta E = \dots$ a) q_G b) q_V c) q_F d) q_P
- 4) $\chi = \dots$ a) $\frac{C_V}{C_P}$ b) $\frac{C_P}{C_V}$ c) $\frac{C_V}{C_H}$ d) $\frac{C_V}{C_F}$
- 5) For Isotherm expan. of an ideal gas: $\Delta E = \dots$ a) 0.00, b) const., c) H
- 6) For Isotherm expan. of an ideal gas: $\Delta T = \dots$ a) 0.00, b) const., c) H
- 7) For Adiabatic expansion of an ideal gas: $\Delta Q = \dots$ a) 0.00, b) const., c) H
- 8) For Adiabatic expansion: $\Delta E = \dots$ a) 0.00, b) const, c) H, d) G
- 9) For Adiabatic expansion: $\Delta T = \dots$ a) 0.00, b) const, c) H, d) G
- 10) For Adiabatic expan.: system is a) open, b) closed, c) large, d)
- 11) In Carnot cycle: F_1 is a) Adiabatic, b) Reversible, c) Irrevers. d) Iso-
- 12) In Carnot cycle: F_2 is a) Isotherm, b) Revers., c) Irrevers. d) Adiabatic
- 13) In Carnot cycle: F_3 is a) Adiabatic, b) Reversible, c) Irrevers. d) Iso-
- 14) In Carnot cycle: F_4 is a) Isotherm., b) Revers., c) Irrev. d) Adiabatic
- 15) In Isothermal; Heat transfer: a) excess b) Forbid, c) 0.0, d) allowable
- 16) $Q = \Delta E + \dots$ a) H, b) M, c) X, d) ΔW
- 17) 'The efficiency' $\eta\% = 100$, if $T_1 = 100$: a) 100 b) 50 c) 120 d) 0.00
- 18) The $\eta\% = 0.0$, if $T_1 = 0.0$ a) $T_1 = T_3$ b) $T_1 = T_4$ c) $T_1 = T_{00}$ d) $T_1 = T_2$
- 19) $\eta\% = -50$, if a) $T_1 = T_2$ b) $T_1 = T_2$ c) $T_1 = T_2$ d) $T_1 = 2T_2$
- 20) $\eta\% = 50$ if a) $T_1 = T_2$ b) $T_1 = 3T_2$ c) $4T_1 = T_2$ d) $T_2 = 2T_1$
- 21) $\frac{T_1}{T_2} = \dots$ a) $\frac{P_1}{P_2}$, b) $\frac{H_1}{H_2}$, c) $\frac{E_1}{E_2}$ d) $\frac{F_1}{F_2}$
- 22) $H = E + \dots$ a) PV b) PH c) GH d) HR
- 23) $dH = dE + PdV + \dots$ a) VdP b) VdH c) PdX d) PdX
- 24) $C_V = \dots$ a) $\frac{dE}{dT}$ b) $\frac{dE}{dH}$ c) $\frac{dE}{dX}$ d) $\frac{dE}{dF}$
- 25) $C_P = \dots$ a) $\frac{dH}{dT}$ b) $\frac{dE}{dT}$ c) $\frac{dE}{dX}$ d) $\frac{dG}{dH}$