

الفقه الرابح



Faculty of Science
Fourth Level, Computer Science

الشبكات العصبية 459 رك

Date: 2023-09-16 , Time: 2 hours
THE EXAM IS IN THREE PAGES: 50 Questions



Q1- Choose true for the correct sentence and false for the wrong sentence (10 Marks)

1. Neural network is old field in computer science.
2. The aim of neural network is "Min loss function"
3. It is recommended to make large neural network to solve the classification problem.
4. Deep learning can be used in discovering new science.
5. The first layer in any deep learning network is maxpool.
6. The core of TensorFlow is using the concept the computational graph.
7. TensorFlow is better than pyTorch.
8. Large dataset is one of many reasons (أحد اسباب) for advancing the deep learning methods.
9. We can use personal laptop in training large neural network.
10. The activation function ReLU has a role in advancing the deep learning technique.

Q2. Assume that we next matrix. What are the results of max pool with 2x2 filter and stride 2. (5 marks)

[1 1 2 4
5 6 7 8
3 2 1 0
1 2 3 4]

What is the maxpool for this matrix?

Q3. (10 marks)

Assume that we have the next matrix

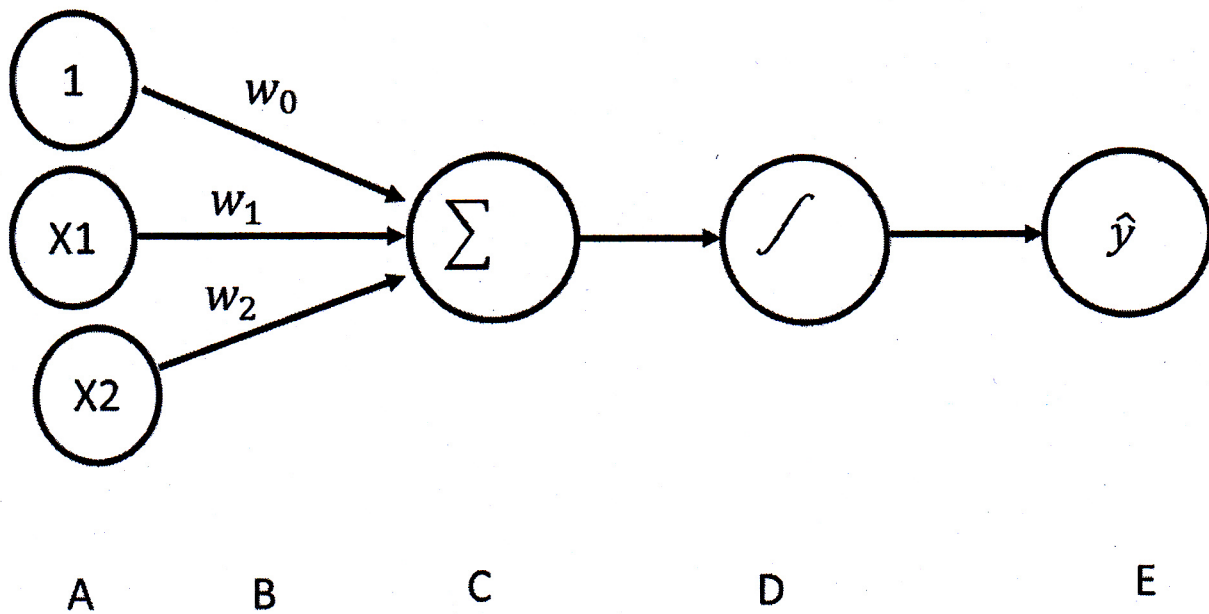
$A = \begin{bmatrix} 1 & 1 & 1 & 0 & 0 \\ 0 & 1 & 1 & 1 & 0 \\ 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 1 & 0 & 0 \end{bmatrix}$

, and we have the filter

$F = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$

What is Conv2D for the matrix A with the filter F?

Q4. Assume we have the next figure (5 marks)



What is A?

What is B?

What is C?

What is D?

What is E?

Q5 Draw the autoencoder network (10)

Q5 Draw the GAN network (5 mark)

Q6. Write about the computational graph (5 marks).

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End of Questions.

Best Wishes,

Ibrahim Elsemman



"استعين بالله ولا تعجز"

الامتحان خمس (٥) صفحات - الإجابة في نفس الصفحة

Question No. 1: Put True or False:

(10 Marks)

1. Parallel computing is the use of a parallel computer to reduce the time needed to solve a single computational problem. ()
2. A parallel computer is a multiple-processor computer system supporting parallel programming ()
3. In distributed computing system, there is a local memory belongs each CPU. ()
4. The concurrency is the operations that may be performed in parallel. ()
5. The primary reason for the poor speedup when experimentally determined serial fraction e does not change with increasing number of processors is the large fraction of sequential part. ()
6. The primary reason for the poor speedup when experimentally determined serial fraction e increases as the number of processors increasing is parallel overhead. ()
7. The maximum speedup we achieved using Amdahl law is $1/f$, where f is the serial fraction. ()
8. One of the most disadvantages off Amdahl law is its consideration of parallel overhead. ()
9. The maximum speedup we achieved using Amdahl law is the same value of serial fractional f ()
10. In parallel computing system, there is a local memory belongs each CPU. ()

Question No. 2: Choose the correct answer:

(10 Marks)

1. which of the following is not a tool to explore the parallelism
 - a) Data Dependence Graphs
 - b) Data Parallelism
 - c) Functional Parallelism
 - d) Data clustering
2. If a single function applies to different data, this is called
 - a) Data Dependence Graphs
 - b) Data Parallelism
 - c) Functional Parallelism
 - d) Data clustering

Question No. 3: State the terminology:

(10 Marks)

1. It is a well-known example of a shared medium.

(.....)

2. It can degrade the performance of a heavily utilized shared medium.

(.....)

3. It support point-to-point messages among pairs of processors.

(.....)

4. It is a classification scheme of parallel computers depends on the parallelism exhibits in its instruction stream and its data stream.

(.....)

5. It is the minimum number of edges between switch nodes that must be removed in order to divide the network into two halves.

(.....)

6. The graph which each node represents processor or switch and edge represents communications path.

(.....)

7. The largest distance between two switch nodes.

(.....)

8. Process of dividing the computation and data into pieces in Foster model.

(.....)

9. Type of communication where significant number of the primitive tasks must contribute data to perform a computation.

(.....)

10. Process of grouping tasks into larger tasks in order to improve performance or simplify programming in Foster model.

(.....)

Question 4: Solve the following problem with stating the used formula and naming the terms in the formula: (20 Marks)

(a) If 25 percent of the operations in a parallel program must be performed sequentially, what is the maximum speedup achievable?

(b) An application executing on 64 processors requires 220 seconds to run. Benchmarking reveals that 5 percent of the time is spent executing serial portions of the computation on a single processor. What is the scaled speedup of the application?

(c) What is maximum speed up when 90% of a calculation can be parallelized for 10 processors?

(d) What is the maximum fraction of a program's parallel execution time that can be spent in serial code if it is to achieve a scaled speedup of 7 on 8 processors?

End of Exam, with my best wishes:

Dr- Abdel-Rahiem Ahmed Hashem Mohammed

د. عبدالرحيم احمد هاشم محمد

"اسْتَعِينُ بِاللّٰهِ وَلَا تَعْجَزْ"

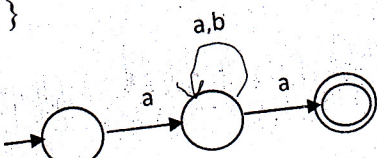
الامتحان أربع (٤) صفحات - الإجابة في نفس الصفحة

Question 1: State the terminology of these definitions (5 Marks)

1. Type of FA where it has an arrow with the label ϵ . (.....)
2. In this concept, the machine has several choices for the next state at any point. (.....)
3. Any countable set of strings over some fixed alphabet. (.....)
4. The graphical representation of regular expression. (.....)
5. The expressions describing languages using regular operations. (.....)

Question 2: Put True or False for each of the following items (15 Marks)

1. For alphabet $\Sigma = \{a, b\}$, the regular expression for the language whose strings start with a or end with b is $a(a|b)^*|(a|b)^*b$.
2. The regular expression $a|ab^*$ accepts the string abb .
3. The regular expression $(\epsilon|a)b$ accepts the string b .
4. DFA special case of NFA
5. $\Sigma^+ = \Sigma^* - \{\lambda\}$

6. The NFA  accepts the string a .

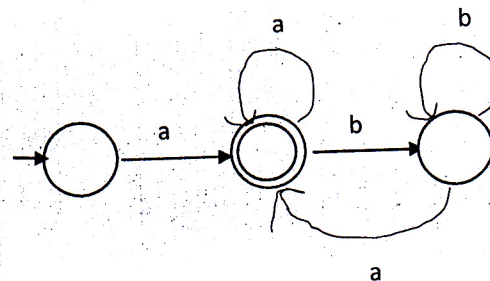
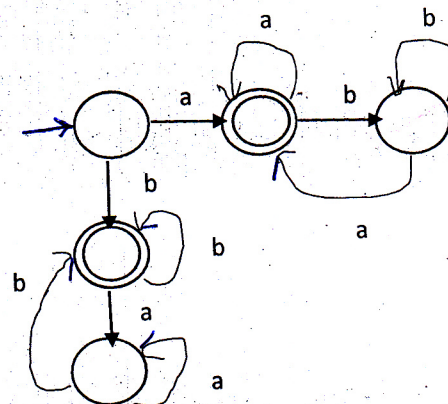
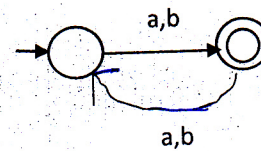
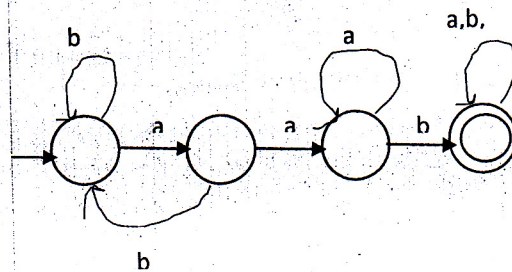
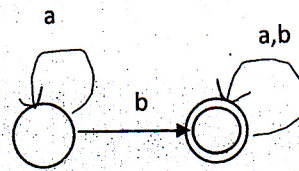
7. The NFA  accepts the empty string ϵ .

8. $0^*10^* \{w | w \text{ contains a single } 1\}$

9. $(0|1)^*1(0|1)^* = \{w | w \text{ has at least one } 1\}$.

Question 4: choose the right letter of the DFA which corresponds with the regular expression, and write the letter in front of the number of RegExp: **(10 Marks)**

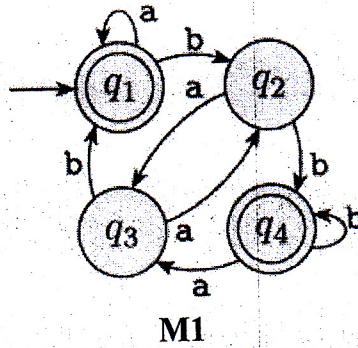
No.	RegExp	Answer	Letter
1	$(a b)^*aab(a b)^*$		A
2	$a b a(a b)^*a b(a b)^*b$		B
3	$a(a b)^*a a$		C
4	$(a b)^*b(a b)^*$		D
5	$((a b)(a b))^*(a b)$		E



10. $(0|1)^*001(0|1)^* = \{w \mid w \text{ contains the string } 001 \text{ as a substring}\}.$
11. $\Sigma^0 = \{\epsilon\}.$
12. $\Sigma^* = \Sigma^1 \cup \Sigma^2 \cup \dots \cup \Sigma^k \cup \dots$
13. Σ^* is finite set.
14. The regular expression **$a|ab^*$** accepts all strings which start with **b**.
15. The language defined from **$L = \{a^n b^n : n \geq 0\}$** accept the string **aabbbb**.

Question 3: design the **DFA** of the language whose strings contain even number of 1's (ones).
(10 Marks)

Question 5: For the following DFA, M1; answer the following questions: (10 Marks)



1. What is the start state?
2. What is the set of accept states?
3. Does the machine accept the following strings? Sign ✓ in the correct place in the table.

The string	Accept	Does not accept
aabb		
bbaa		
aaa		
abaab		
abaa		

4. Give the formal description of the machine **M1**

End of Exam, with my best wishes:
Dr- Abdel-Rahiem Ahmed Hashem Mohammed
 د. عبد الرحيم أحمد هاشم محمد



"اَسْتَعِزْ بِاللّٰهِ وَلَا تَعْجِزْ"

الامتحان ست (٦) صفحات - الإجابة في نفس الصفحة

Question 1: State the terminology of these definitions (10 Marks)

1. Summarization of the general characteristics or features of a target class of data.
(.....)
2. A step of KDD where removing noise and inconsistent data.
(.....)
3. Process of combining multiple data sources in a single database.
(.....)
4. A statistical measure which its major problem is its sensitivity to extreme (e.g., outlier) values.
(.....)
5. Kind of knowledge shows the probability of relationships between data items, within large data sets.
(.....)

Question 2: Put *True* or *False* for each of the following items (15 Marks)

عَلِّم إجابتك بالجدول المرفق في نهاية الإمتحان

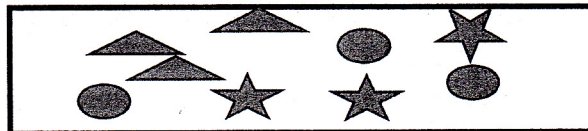
1. The dissimilarity between $X = (\text{blue}, A)$ and $Y = (\text{red}, A)$ is 0.5 where the attributes described X and Y are nominal.
2. In **Apriori** techniques, we do not consider the super set if at least one of its sub sets not frequent.
3. In some experience, we measure the length of students, this length variable is considered ration-scale variable.
4. Classification tends to predict the class label when these labels represent infinite and countable values.
5. The confidence c of the rule $A \rightarrow B$ is the percentage of transactions in data set containing A that also contain B .
6. Bayesian classifier is a class of learning algorithm that tries to find an optimum classification of a set of examples using the probabilistic theory.
7. Data integration is the process of combining multiple data sources in a single database.
8. Regression tends to predict the class label when these labels represent infinite and uncountable values.
9. A major problem with the mean as a statistical representing is its sensitivity to extreme/outlier values.
10. Frequent sequential pattern occurs when customer tend to purchase first something, followed by purchase another something.
11. Decision tree technique is used to discover association rules in a big data.

12. We can compute the basic central tendency measures except the mean value for the Nominal attribute.
13. Information is an interesting pattern which has meaningful use.
14. The information is the output of the KDD process.
15. Pattern evaluation and knowledge representation, these two steps are considered data preprocessing in KDD process.

Question 3: Choose the correct answer (15 Marks):

عَلِّم رَقْمَ إِجَابَتِكَ بِالْجَدُولِ الْمَرْفُوقِ فِي نَهَايَةِ الْإِمْتِحَانِ

1. The process carried out to isolate the human objects from scene images is called
 - a) Classification
 - b) Clustering
 - c) Characterization
 - d) mining frequent pattern
2. Results of some medical test
 - a) Nominal attribute
 - b) Ratio-scale attribute
 - c) Ordinal attribute
 - d) Interval-scale attribute
3. The entropy of this set $S_1 = \{A, A, A, B, B\}$ is
 - a) $\text{Ent}(S_1) = 0.971$
 - b) $\text{Ent}(S_1) = 0.651$
 - c) $\text{Ent}(S_1) = 0.918$
 - d) None of above
4. Which of the following is not measure of data dispersion?
 - a) mode
 - b) Range
 - c) Interquartile range
 - d) Standard deviation
5. Number of sons for each Egyptian family
 - a) Ratio-scale attribute
 - b) Nominal attribute
 - c) Ordinal attribute
 - d) Interval-scale attribute
6. we can compute the basic central tendency except the mean value for the ...
 - a) Ratio-scale attribute
 - b) Ordinal attribute
 - c) Nominal attribute
 - d) Interval-scale attribute
7. The process by which a three-year-old child divides the following shapes into similar groups is called



- a) Data Characterization
- b) Data clustering
- c) Data Classification
- d) Data selection

8. The dissimilarity between the two examples $x = (1,0,0,0,0,0,0,0,0,0)$ and $y = (0,0,0,0,0,0,1,0,0,1)$ where the ten attributes are symmetric binary
- a) 0
 - b) 0.3
 - c) 0.1
 - d) 3.5
9. The similarity between the two examples $x = (0,1,1,1,0,0,0,0,0,0)$ and $y = (0,0,0,0,0,0,1,0,1,1)$ where the ten attributes are symmetric binary
- a) 0
 - b) 0.4
 - c) 0.1
 - d) 0.7
10. Which of the following attributes we compute mode only for it?
- a) Ordinal attribute
 - b) Nominal attribute
 - c) Interval attribute
 - d) Ratio attribute
11. If we have the following list $A = (9 \ 20 \ 2 \ 15 \ 8 \ 12 \ 4)$, the value of IQR (Interquartile range) is
- a) 9
 - b) 4
 - c) 15
 - d) 6
12. The entropy of this set $S_1 = \{A, A, A\}$ is
- a) $\text{Ent}(S_1) = 0.0$
 - b) $\text{Ent}(S_1) = 0.651$
 - c) $\text{Ent}(S_1) = 0.5$
 - d) $\text{Ent}(S_1) = 1.0$
13. The dissimilarity between $X = (\text{blue}, \text{Code A}, \text{farmer})$ and $Y = (\text{red}, \text{Code A}, \text{doctor})$ is
- a) 0.66
 - b) 0.0
 - c) 0.33
 - d) 1.0
14. For the list $A = (9 \ 20 \ 2 \ 15 \ 8 \ 12 \ 4)$, which of the following is correct?
- a) $Q_2 = \text{IQR}$
 - b) $Q_2 = Q_1 + Q_3$
 - c) $\text{Range} < \text{IQR}$
 - d) None of the mentioned
15. Celsius temperatures can measure through
- a) Interval-scale attribute
 - b) Ration-scale attribute
 - c) Ordinal attribute
 - d) Nominal attribute

Question 4: The following data set consists of four variables (attributes); the first three are decision variables, **Time**, **Gender** and **Area**, the fourth one is the class label, **Risk**.
(10 Marks)

Where:

Time is time since obtaining a driver license in years 1-2(little), 2-7(medium), >7(much)

Gender is {male, female}

Area is residential area {urban(حضرى), rural(ريفى)}

Time	Gender	Area	Risk (Class label)
little	male	urban	Low
medium	male	rural	High
much	female	rural	Low
little	female	rural	High
much	male	rural	High
little	male	rural	High
medium	female	urban	Low
medium	male	urban	Low

- Compute the information gain for each attribute; **GPA** and **Studied**
- Construct the decision tree of this dataset

Question 1: State the terminology of these definitions (10 Marks)

1. Summarization of the general characteristics or features of a target class of data. (10 Marks)
2. A step of KDD where removing noise and inconsistent data. (10 Marks)
3. Process of combining multiple data sources in a single database. (10 Marks)
4. A statistical measure which its major problem is its sensitivity to extreme (e.g., outlier) values. (10 Marks)
5. Kind of knowledge shows the probability of relationships between data items, within large data sets. (10 Marks)

Question 2: Put True or False for each of the following items (15 Marks)

1. The dissimilarity between $X = (blue, A)$ and $Y = (red, A)$ is 0.5 where the attributes described K and Y are nominal. (10 Marks)
2. In Apriori technique, we do not consider a proper set if at least one of its sub sets not frequent. (10 Marks)
3. In some experience, we measure the length of students, this length variable is considered ration scale variable. (10 Marks)
4. Classification tends to predict the class label when these labels represent infinite and countable values. (10 Marks)
5. The confidence c of the rule $A \rightarrow B$ is the percentage of transactions in data set containing A that also contain B. (10 Marks)
6. Bayesian classifier is a class of learning algorithm that uses the probabilistic theory for classification of a set of examples using the probabilistic theory. (10 Marks)
7. Data integration is the process of combining multiple data sources in a single database. (10 Marks)
8. Regression tends to predict the class label when these labels represent infinite and uncountable values. (10 Marks)
9. A major problem with the mean as a statistical representing is its sensitivity to extreme outlier values. (10 Marks)
10. Frequent sequential pattern mining is used to find rules in a big data. (10 Marks)
11. Decision tree technique is used to find rules in a big data. (10 Marks)

End of Exam, with my best wishes:

Dr- Abdel-Rahiem Ahmed Hashem Mohammed

د. عبدالرحيم احمد هاشم محمد

Q2	True	False
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Q3	a	b	c	d
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Good Luck
Dr/Abdel-Rahiem A. Hashem



Question 1 Choose the correct answer

(20 points)

1. The Hash Function takes an input of arbitrary length and converts it into a fixed length output
 - a. True
 - b. false
2. In A5/1 cipher the key is _____ bits
 - a. 56
 - b. 64
 - c. 61
 - d. 62
3. Use Caesar cipher to decrypt the following: HQFUBSWHG WHAW
 - a. ABANDONED LOCK
 - b. ENCRYPTED TEXT
 - c. KTXDONED ZKDZ
 - d. ENCRYPTED LOCK
4. In the DES algorithm the round key is _____ bit and the Round Input is _____ bits.
 - a. 48, 32
 - b. 64, 32
 - c. 56, 24
 - d. 32, 32
5. What is the formula used for decrypting of data using affine cipher (a,b are constants and x is the letter to be decrypted)
 - a. $a^{-1}(x-b) \bmod 26$
 - b. $(ax+b) \bmod 26$
 - c. $b^{-1}(x-a) \bmod 26$
 - d. $x^{-1}(a-b) \bmod 26$
6. A set of numbers is called as super increasing if
 - a. each element is greater than previous element
 - b. each element greater than sum of all the previous elements
 - c. each element greater than the average of all elements
 - d. None of the mentioned
7. What will be the encrypted text corresponding to plain text "SANFOUNDRY" using rail fence cipher with key value given to be 2?
 - a. SNONRAFUDY
 - b. SORAFUDYNN
 - c. SNAUDNORFY
 - d. SANFOUNDRY

8. The Iris pattern is changed throughout a human lifetime, so that Iris is the best for authentication
 - a. True
 - b. False
9. In Vigenère Tableau Cipher in Decryption phase the key letter identifies the row, and the position of the ciphertext letter in that row determines the column, and the plaintext letter is at the top of that column.
 - a. True
 - b. False
10. How many rows will the letters of the plain text occupy in the table, that is used for encryption in columnar transposition cipher when a given keyword is "SECRET" and plain text is "SANFOUNDRY"?
 - a. 2
 - b. 3
 - c. 4
 - d. 5

Question 2

(5 points)

Using one time pad the key that encrypts APPLE modulo 26 to yield ciphertext QJKES is:

Question 3**(5 points)**

For $P=11$ and $q=3$ and choose $e=3$. Apply RSA algorithm to find the plaintext where cipher message is 9

Question 4**(5 points)**

Users A and B use the Diffie-Hellman key exchange technique with a common prime $q = 71$ and generator $a = 7$. If user A has private key $X_A = 5$, If user B has private key $X_B = 12$. What is the shared secret key?

Question 5**(10 points)**

Suppose that the plaintext "friday" is encrypted using a 2×2 Hill cipher to yield the ciphertext PQCFKU. Find the key

Question 6**(5 points)**

What will be the ciphered text if the string "SANFOUNDRY" is given as input to the code of playfair cipher with keyword as "SECRET" (assuming j is combined with i)?

أجب عن الأسئلة التالية:

السؤال الأول: (10 درجات)

(1) اختيرت عينة عشوائية حجمها $n = 64$ من مجموعة عامة بالتوزيع المعتدل بالبارامترات $\mu = 51.4$, $\sigma = 6.8$ أوجد الاحتمالات التالية:

(i) $P(\bar{x} < 52.9)$

(ii) $P(50.5 < \bar{x} < 52.9)$

(2) إذا كانت x_1, x_2, x_3 تمثل مفردات عينة عشوائية من مجموعة عامة بالتوزيع المعتدل بالبارامترات μ, σ^2 ، أثبت أن التقدير $\bar{y} = \frac{1}{4}(x_1 + 2x_2 + x_3)$ غير متحيز للمتوسط العام μ ، ثم أوجد الكفاءة النسبية للتقدير $\bar{x}$ بالنسبة للتقدير $\bar{y}$ وعين التقدير الكفو بينهما.

السؤال الثاني: (10 درجات)

(1) اختيرت عينة عشوائية حجمها n من مجموعة عامة دالة كثافة توزيعها هي

$$f(x) = \begin{cases} \frac{2(\theta - x)}{\theta^2}, & 0 < x < \theta \\ 0, & O.W \end{cases}$$

أوجد تقدير البارامتر θ باستخدام طريقة العزوم.

(2) من مجموعة عامة بالتوزيع المعتدل بالبارامترات μ, σ^2 اختيرت عينة عشوائية حجمها $n = 25$ ، فإذا كان $\bar{x} = 20, s^2 = 9$ أوجد فترة الثقة للمقدار $2\mu + 3$ وذلك عند مستوى ثقة 95%.

السؤال الثالث: (10 درجات)

(1) إذا كانت $\bar{x}_1, \bar{x}_2$ هي قيم المتوسطات لعينتين مستقلتين حجوما n_1, n_2 من مجموعتين بالتوزيع المعتدل معلومتي التباين σ_1^2, σ_2^2 على الترتيب. استنتج فترة الثقة للفرق بين المتوسطين $\mu_1 - \mu_2$ وذلك عند مستوى الثقة $1 - \alpha$.

(2) القراءات التالية تمثل عينة عشوائية من مجموعة عامة بالتوزيع المعتدل. 2.8, 1.9, 1.4, 1.8, 2.1, 3.2, 2 أوجد حدود فترات الثقة للتباين العام والانحراف المعياري العام وذلك عند مستوى الثقة 90%.

السؤال الرابع: (10 درجات)

(1) من مجموعتين بالتوزيع المعتدل، اختيرت عينتان مستقلتان حجوما $n_1 = 10, n_2 = 12$ على الترتيب. إذا كانت

$s_1 = 8, s_2 = 5$ أوجد حدود فترة الثقة للنسبة $\frac{\sigma_1^2}{\sigma_2^2}$ وذلك عند مستوى ثقة 98%.

(2) من مجموعتين مستقلتين بالتوزيع المعتدل $N(\mu_1, \sigma_1^2 = 19)$ و $N(\mu_2, \sigma_2^2 = 24)$ ، اختيرت عينتان عشوائيتان بياناهما كالتالي: $n_1 = 30, \bar{x}_1 = 115$ و $n_2 = 37, \bar{x}_2 = 127$. اختبر صحة الفرض الصفري $H_0: \mu_1 = \mu_2$ مقابل الفرض البديل $H_1: \mu_1 < \mu_2$ وذلك عند مستوى معنوية $\alpha = 0.01$.

باقي الأسئلة في الخلف،،،

السؤال الخامس: (10 درجات)

- (1) في عينة عشوائية مكونة من 500 فرد بأحد التجمعات وجد أن 175 فرد منهم يفضلون الجلوس في المقاهي وقت فراغهم، اختبر الفرض الصفري عن النسبة الفعلية لهذه الفئة $H_0: \theta = 0.3$ مقابل الفرض البديل $H_1: \theta > 0.3$ وذلك عند مستوى معنوية 1%.
(2) في تجارب مندل على الحمض النووي لوحظ أن 315 من الذرة الصفراء مدورة، و 108 خضراء مدورة، و 101 صفراء مجعدة، و 32 خضراء مجعدة، فإذا علمت أن التوزيع النظري لهذه الأنواع بموجب نظرية الوراثة يكون وفقاً للنسب 9: 3: 3: 1. المطلوب معرفة ما إذا كان هناك أي اختلاف يوجب الشك في النظرية الوراثة وذلك عند مستوى دلالة 1%.

استخدم ما يلزم من القيم الجدولية التالية:

$$P(0 < Z < 1.06) = 0.3554, \quad P(0 < Z < 1.76) = 0.4608, \quad P(0 < Z < 2.33) = 0.49, \\ T[0.975, 24] = 2.064, \quad F[0.01, 9, 11] = 4.39, \quad F[0.01, 11, 9] = 5.11, \\ \chi^2[0.05, 6] = 12.592, \quad \chi^2[0.95, 6] = 1.635, \quad \chi^2[0.99, 3] = 11.3$$

 قسم الرياضيات كلية العلوم	المقرر : بحوث عمليات (2) 426 الفرقة : المستوي الرابع علوم الزمن : 3 ساعات التاريخ : السبت 2023/5/27 الدرجة : 50 درجة	جامعة اسيوط كلية العلوم قسم الرياضيات امتحان الفصل الثاني للعام الجامعي 2022-2023
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أجب عن الأسئلة الآتية: كل سؤال (10 درجات)

السؤال الأول: (أ) برهن أن الشرط الكافي لنقطة التشبع x^* (التي تكون المشتقات الجزئية للدالة مساوية للصفر) لكي تكون نقطة تطرف هو أن مصفوفة الهسين H تكون موجبة فإن النقطة تكون نهاية صغرى وإذا كانت سالبة تكون نهاية عظمى .

(ب) حدد القيم القصوى للدالة $f(x) = x_1^3 + x_2^3 + 2x_1^2 + 4x_2^2 + 6$.

السؤال الثاني: (أ) أوجد مفكوك تيلور حتي الدرجة الثانية للدالة $f(x) = x_2^2 x_3 + x_1 e^{x_3}$ حول النقطة

$$\underline{x}^* = (1, 0, -2)$$

(ب) أوجد مصفوفة الهسين للدالة $f(x) = x_2^2 x_3 + x_1 e^{x_3}$ عند النقطة $\underline{x}^* = (2, -1, 3)$.

السؤال الثالث: أستخدم طريقة مضروبوات لاجرانج في حل المشكلة التالية

$$Max \ f(x_1, x_2) = x_1^2 x_2 \quad S.t \quad g(x_1, x_2) = 2x_1^2 + 2x_1 x_2 - 12 = 0$$

ثم طبق الشرط الكافي لمعرفة ان النقطة نهاية عظمى .

السؤال الرابع: بأستخدام طريقة خطوة الانحدار الشديد أوجد طول الخطوة a للدالة

$$f(x) = 3x_1^2 + 2x_2^2 + 2x_1 x_2 + 7 \quad \text{ثم اوجد الحل عند } (x_1^0, x_2^0) = (1, 2)$$

السؤال الخامس: بأستخدام طريقة نيوتن اوجد القيمة الصغرى للدالة $f(x) = 2x_1^2 + x_2^2 - 2x_1 x_2$

$$(x_1^0, x_2^0) = (5, 5)$$

عندما

مع تمنياتي بالنجاح والتوفيق

د/ مصطفى علي الخطيب

Department of Mathematics		قسم الرياضيات
Faculty of Science		كلية العلوم
الامتحان النهائي للمستوى الرابع للفصل الدراسي الثاني 2023/ 2022 م		
التاريخ: 2023 / 6 / 1 م الزمن: 3 ساعات	الدرجة الكلية: 50 درجة	اسم المقرر: تحليل عددي (2) رمز المقرر: 424

Answer the following questions:

1) Solve the following system

$$10x_1 + 3x_2 + 2x_3 = 15$$

$$x_1 + 10x_2 + 5x_3 = 16$$

$$x_1 + 6x_2 + 10x_3 = 17$$

By the method of iteration. Show that the process of iteration converges for the above system. What is the maximum error after applying 13 iterations ?

a) Solve the equation $y' = x + y$, $y(0) = 1$

From $x=0$ to $x=0.2$ using the second order Predictor-Corrector method.
($h=0.1$).

b) Solve by difference method the B. V. P.

$$y'' + y = 0, \quad y(0) = 0 \text{ and } y(1) = 1, \quad (h = 0.25)$$

3) Derive the recurrence relation of Chebyshev polynomial:

$$T_{n+1}(x) = 2xT_n(x) - T_{n-1}(x), \quad n = 1, 2, \dots,$$

Then prove that:

$$(i) \int_{-1}^1 \frac{[T_i(x)]^2}{\sqrt{1-x^2}} dx = \frac{\pi}{2}, \quad \forall i \geq 1$$

$$(ii) T_i(x)T_j(x) = \frac{1}{2} [T_{i+j}(x) + T_{i-j}(x)]$$

For any positive integers i and j with $i \geq j$.

من فضلك باقي الاسئلة في خلف الصفحة <<<

- 4) Use Le Verrier-Faddeev method to find the characteristic equation of the matrix:

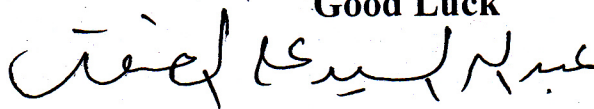
$$A = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 2 \end{bmatrix}, \text{ then find the eigenvalues and the eigenvectors.}$$

- 5) Given the I.V.P. $y' = 2y, 0 \leq x \leq 1, y(0) = 1$

(exact solution $y = e^{2x}$)

- (i) Solve the difference equation which results from Euler's method.
 - (ii) Find an upper bound on the error at $x=1$ in terms of step size h .
 - (iii) Compare the bound from (ii) with the actual error as obtained from (i) at $x=1$ for $h=0.1$
-

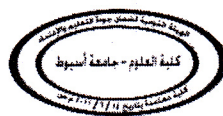
Good Luck



Prof. A. El- SAFTY



Department of Mathematics
Faculty of Science
Time: 2 hours



Scientific Computations 1
Final Exam
8 / 6 / 2023



Assiut University
Marks: 50
Course code: 451MC

Answer the following questions

Question No.1 :

(30 marks)

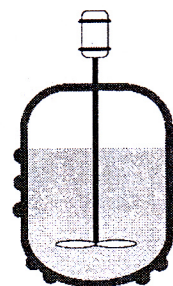
Choose the best single correct answer

(One and a half marks for each question)

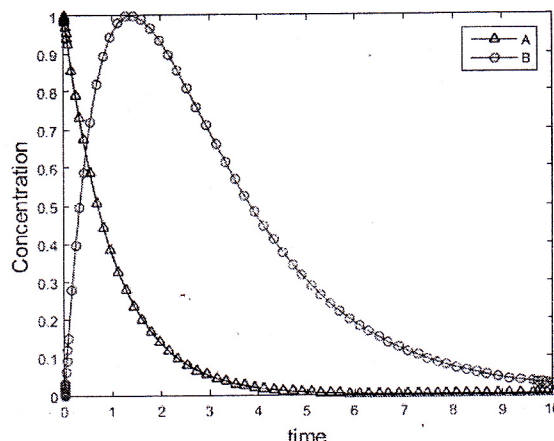
✚ Consider a batch reactor where these reactions take place

$$\frac{dA}{dt} = -k_1 A, \quad \frac{dB}{dt} = 2k_1 A - k_2 B$$

The following code using MATLAB program to compute the concentrations of A and B using $k_1 = 1$, $k_2 = 0.5$, $A_0 = 1$, $B_0 = 0$, $x(1)=A$ and $x(2)=B$ in time range of $[0, 10]$. Answer the following four items.



```
function dx = concentration( t,x,k1,k2 )
x = [-k1.*.... ① ..... ; 2.*k1.*x(1) - k2.*x(2)];
end
[t,x] = ... ②...(@ (t,x)concentration(t,x,1,0.5),
[0 10], [1;0]);
... ③ .... (t,x(:,1),'b-*',t,x(:,2),'g-o','linewidth',1);
xlabel('time','fontsize',14)
ylabel('concentration','fontsize',14)
... ④ ..... ('A','B')
```



- The correct function in place number ① is:
 - $x(1)$
 - $x(2)$
 - $@(x'(1))$
 - $'(x(2))'$
- The appropriate function in place number ② is:
 - Dsolve
 - ode45
 - Solve
 - dsolve45
- Which of the following commands is valid in place number ③?
 - par
 - surf
 - plot
 - plot3
- In the position ④, which of the following commands is valid?
 - title
 - legend
 - label
 - show

5. Which of the following commands is used to generate a random number between 0 and 40?

- a) `x=linspace(0,1,40)`
c) `x=line(0,40)`

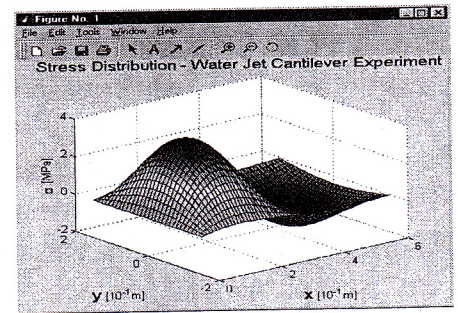
- b) `x=40.*rand(1)`
d) `x=rand(40)`

6. In MATLAB, to produce $n \times m$ matrix of random numbers between 0 and 1, we use the command

- a) `ran(n,m)` b) `random(n,m)` c) `rand(n,m)` d) `rand(n×m)`

* Data from a water jet experiment suggests the following non-linear 2-D model for the stress $\sigma = \alpha e^{-\beta x} [\sin(\theta x) * \cos(\phi y)]$ where: σ = localized planar stress [MPa], x = distance from end of beam [10^{-1} m] and y = distance from centerline of beam [10^{-1} m]. The following MATLAB code is used to plot the resulting stress distribution. For the particular setup used: ($x = \{0 \text{ to } 2\pi\}$, $y = \{-\frac{\pi}{2} \text{ to } \frac{\pi}{2}\}$, $\alpha = \theta = \phi = 1$, $\beta = -0.2$), answer the following five questions from 7-11:

```
x = 0:0.1:2*pi;
y = -pi/2:0.1:pi/2;
[x,y] = .....①...(x,y);
z = exp(-0.2*x) .* sin(x) .* cos(y);
... ②..... (x,y,z)
...③... ('Stress Distribution-Water
Jet Cantilever Experiment')
```



7. We use the command in number ① to define the values of the variables x and y

- a) `mesh` b) `linspace` c) `meshgrid` d) `axis`

8. To draw this surface in MATLAB we use the command ----- in line number ②

- a) `plot` b) `mesh` c) `plot3` d) `surf`

9. In the place number ③, we use the command ----- to add a title to the figure

- a) `legend` b) `label` c) `title` d) `addtitle`

10. The command used to create a grid on the current figure in MATLAB is

- a) `hold on` b) `grid on` c) `legend` d) `label`

11. The command used to add name to the x -axis on the current figure is

- a) `xlabel` b) `xtitle` c) `labelx` d) `ylabel`

12. What is the output of the following code?

```
x=[5,3,7,10,4];
median(x)
```

- a) 4 b) 5.8 c) 29 d) 5

```
z = 0:0.1:40; x = cos(z); y = sin(z);
```

-

Answer the following five questions from 14-18

a) (0,1,0.6,3) b) (0,1,3,0.6) c) (1,0,0.6,3) d) (0,0.6,3)

19. A police station receives on average 5 calls per hour, a command in MATLAB program which can be used to get the probability of receiving two calls in a randomly selected hour is:

- a) $y = \text{cdf}(\text{'poiss'}, 2, 5)$
c) $y = \text{pdf}(\text{'poiss'}, 2, 5)$

- b) $y = \text{pdf}(\text{'poiss'}, 5, 2)$
d) $y = \text{cdf}(\text{'poiss'}, 5, 2)$

20. To calculate the cumulative distribution function $F(x)$ in MATLAB we use:

a) makedist

b) cdf

c) pdf

d) rand

Question No.2 :

(10 marks)

Determine whether each of the following statements is true or false

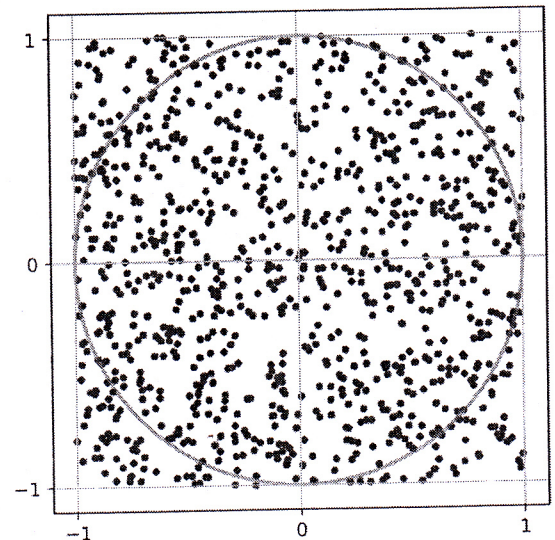
(One mark for each question)

✚ The following code shows how to estimate the value of π using Monte Carlo method that works by randomly sampling points within a 2×2 square. Use the figure on the right to, answer the following four items:

```

% Simulation parameters
square_area = 4;
N = 1000;
radius = 1;
MC_runs = 1000;
% Monte Carlo loop
for jj = 1:MC_runs
    hits = 0;
    for n = 1:N
        ..... ① .....; ..... ② .....;
        if (..... ③ ..... )
            hits = ..... ④ .....;
        end
    end
    circle_area = hits/N * square_area;
    pi_approximate(jj) = circle_area/radius*2;
end
Pi_avg=..... ⑤ ..... ( pi_approximate);

```



1. In the two places ① and ②, to generate random points x and y , we can use

$$x = 1 - 2 * \text{rand}(2); \quad y = 1 + 2 * \text{rand}(1)$$

2. To test which points lie inside the circle in position number ③, we use

$$x^2 + y^2 < \text{radius}^2$$

3. The appropriate way to calculate hits in the place number ④ is hits - 1.

4. The mean command in MATLAB can be used in place number ⑤.

- ✦ The data in the following table are temperature readings from a chemical process in °C, taken every half hour:

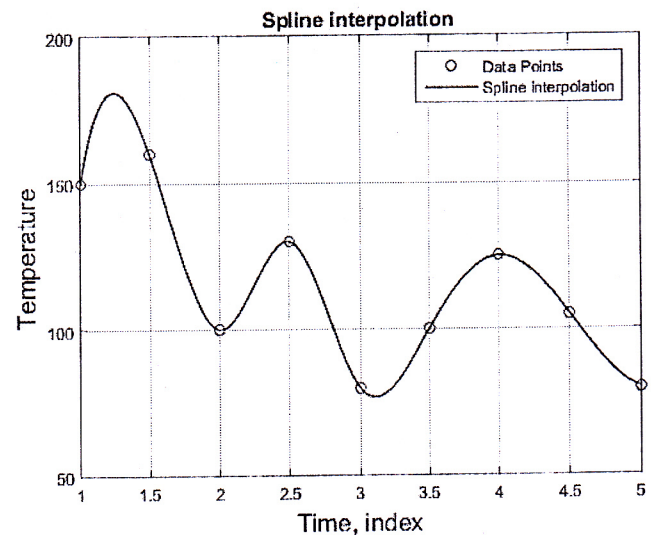
Time	1	1.5	2	2.5	3	3.5	4	4.5	5
Temperature	150	160	100	130	80	100	125	105	80

The following code using MATLAB program to interpolate these data. Use the figure on the right to answer the following five questions from 5-9.

```

-----
% interpolation
x = 1:0.5:5;
y = [150 160 100 130 80 100 125 105 80];
x_new = 0:.01:5;
y_new = .....①.....(x,y,x_new,'.....②.....');
plot(x,y,'rd'); hold;
.....③.....(x_new,y_new,'k');
    hold; grid;
.....④.....('Spline interpolation')
ylabel('Temperature','fontsize',15)
xlabel('Time, index','fontsize',15)
.....⑤.....('Data Points','Spline
Interpolation','fontsize',15)
axis([1 5 50 200]);
-----

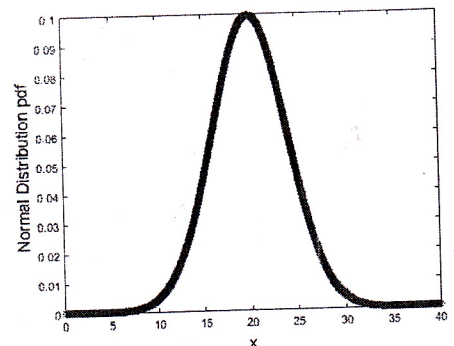
```



5. The appropriate command in place number ① is interp2.
6. In the position number ②, the method which is used to interpolate these data is Monte Carlo method.
7. We can use the command plot in place number ③ to get the drawn figure.
8. In the place number ④, the command used to add a title to the figure is called label.
9. In the position number ⑤, the command used to describe labels for each plotted data is legend.

10. The following code is used to plot the distribution function for the normal distribution using values $x = 0:0.01:40$, mean $\mu=20$ and standard deviation $\sigma=4$.

```
-----
x = 0:0.01:40;
pd =
makedist('Normal','mu',20,'sigma',4)
y = pdf(pd,x)
plot(x,y,'r*')
xlabel('x','fontsize',14);
ylabel('Normal Distribution
pdf','fontsize',14);
-----
```



Question No.3 :

(10 marks)

Answer only two questions from the following

(5 marks for each question)

1. Apply Runge-Kutta of order two to find an approximate value of y when $x=0.1$ and $x=0.2$ given that

$$y'(x) = x^2 - y, \quad y(0) = 1$$

2. Using modified Euler method, find an approximate value of y when $x=0.4$, given that

$$y'(x) = x + y, \quad y(0) = 1, \quad h = 0.2$$

3. Given that $y'(x) = y + e^x$, $y(0) = 0$, find $y(0.2)$ and $y(0.4)$ by Euler's method and compute $y(0.6)$ using Adams method.

----- End of Questions with Our Best Wishes for Success -----

Dr. Esraa Gamal



Dr. Fatma Hussein



Assiut University



Department of Mathematics
Faculty of Science

Final Exam 2022-2023

Scientific Computations (2) (462MC)
For Forth Level Students

Time: 2 hour

8/6/2023

Marks: 50

Answer the following questions

Question No.1 : Choose the best single correct answer (30 marks)

1. What is the default extension for Matlab files?
a) .mat b) .txt c) .m d) .script
2. Which is the invalid variable name in Matlab?
a) last b) sin1 c) 6sin d) sin_6
3. To join one or more strings into a single string is known as
a) Concatenation b) joining c) string conversion d) string theory
4. Which of the following commands creates the array of equidistant points
0, 0.25, 0.5, 0.75, 1?
a) x=linspace(0,1,5) b) x=linspace(0,1,6)
c) x=linspace(0,5,1) d) x=linspace(0,0.1,1)
5. The common data type for numeric value(s) in Matlab?
a) array b) double c) char d) int
6. In Matlab, to join two or more statements with an or condition use the operator
a) or b) U c) & d) |
7. is not a predefined function in Matlab.
a) inf b) gravity c) i d) pi
8. What operator helps in the transpose of a matrix?
a) " ' " b) " " " c) " ./ " d) " .\ "
9. What is Matlab?
a) A high-level programming language b) A low-level programming language
c) A markup language d) A database management system
10. The output of the last line is
y=5; y=3*x
a) 3x b) 15 c) 5 d) ???Undefined function or variable 'x'

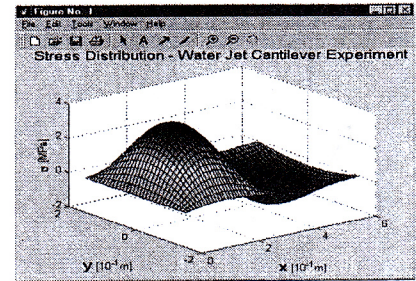
Please, see the next page,,,,,,,,,

11. The while end loop will complete repetitions
 a) until a logic statement is false b) until a logic statement is true
 c) until a counter has expired d) indefinitely
12. What is the default increment value in a for-loop?
 a) 0 b) 1 c) 0/1 d) An increment value is necessary
13. The output for syms x y; diff(y²,x) is
 a) 2 dy/dx b) 2*y c) 0 d) Error
14. To calculate $\sin \frac{\pi}{4}$ in Matlab, we use the command
 a) sin($\pi/4$) b) sin(pi/4) c) sine(4/ π) d) sin[pi/4]
15. What is the use of abs function in Matlab?
 a) returns the square root of number b) returns power of a number
 c) returns magnitude of a number d) None of these
16. What is the output of the following Matlab code:
 u = [1, 2, 3; 4, 5, 6]; v = u'; disp(v)
 a) [1, 2, 3; 4, 5, 6] b) [1, 4; 2, 5; 3, 6] c) [3, 6; 2, 5; 1, 4] d) Error
17. What is the convergence rate of the Newton-Raphson method?
 a) Quadratic b) Linear c) Super linear d) Exponential
18. What is the output of the following code?
 For i=1:4
 a=5; a=a+5
 end
 a) No output will be shown b) Error in the code
 c) a=80 d) a=10
19. To calculate the second derivative of the function
 $f(x, y, z) = x^3 y^2 z$ with respect to y, we use the code
 a) syms x y z; diff2(x³*y²*z, y) b) syms x y z; diff(x³)y²z, x, 2)
 c) sym x y z; diff(x³*y²*z, x, 2) d) syms x y z; diff(x³*y²*z, y, 2)
20. To calculate the integration $\int_1^2 \int_0^1 xy \, dy dx$, we use the code
 a) sym x; int(int(xy,y,1,2),x,0, 1)
 b) sym x y; int2(int(x*y,x,1,2),y,0, 1)
 c) syms x y; int(int(x*y,y,0,1),x, 1, 2)
 d) syms y; int('x*y',y,0, 1, x, 1, 2, 2)
21. To calculate the $\lim_{x \rightarrow 0} \frac{x}{\sin(x)}$ in Matlab, we use the code
 a) syms x; limit(x/sin (x),x,0) b) syms x; limit(x/sin x,x,0)
 c) sym x; lim(x/sin(x), x, 0) d) syms x; limit(x/sin x,0,x)

Please, see the next page,,,,,,,,,

✚ The following Matlab code is used for drawing the figure on the right.
Answer the following five questions from 22-26:

```
x = 0:0.1:2*pi;
y = -pi/2:0.1:pi/2;
[x,y] = .....①...(x,y);
z =exp(-0.2*x) .*sin(x) .*cos(y);
... ②.... (x,y,z)
...③... ('Stress Distribution-Water
Jet Cantilever Experiment')
```



22. We use the command in number ① to define the values of the variables x and y
a) mesh b) linspace c) meshgrid d) axis
23. To draw this surface in Matlab we use the command in line number ②
a) plot b) mesh c) plot3 d) surf
24. In the place number ③, we use the command to add a title to the figure
a) legend b) label c) title d) addtitle
25. The command used to create a grid on the current figure in Matlab is
a) hold on b) grid on c) legend d) label
26. The command used to add name to the x-axis on the current figure is
a) xlabel b) xtitle c) labelx d) ylabel
27. The command used to find the roots for the equation
 $2x^4 + 5x^3 - 13x^2 + 7 = 0$,
a) roots([2 5 -13 0 7]) b) roots(2 5 -13 7)
c) roots([2 5 -13 7]) d) roots([2 5 -13 0 7])
28. The false position method of finding roots of nonlinear equations falls under the category of a (an) _____ method.
a) bracketing b) open c) random d) graphical
29. What is the secant method used for in numerical analysis?
a) Approximating derivatives b) Solving linear systems
c) Finding roots of nonlinear equation d) Interpolating data point
30. How is the bisection method implemented to find the root of an equation?
a) Using a Newton-Raphson iteration b) By dividing the interval into halves
c) Applying the Lagrange interpolation d) Employing Simpson's rule

Please, see the next page,,,,,,,,,

Question No.2 : Determine the following statements is true or false (20 marks)

1. Matlab stands for matrix library.
2. To delete one variable but not the entire workspace, we need to mention the variable name after the clear command.
3. The int command in Matlab can be used to compute both definite and indefinite integrals.
4. To write a function named mycos, the m-file should be saved as mycosfunction.m
5. Colon operator (:) generates regularly spaced elements and represents an entire row or column.
6. The quad command in Matlab uses an adaptive Simpson's rule to compute numerical integration.
7. The value of the expression $y = e^{-a} \sin(x) + 10\sqrt{y}$ for $a=5$, $x=2$, $y=8$ is computed by
 `>>a=5; x=2; y=8;`
 `>> y=exp(-a) sin(x)+10sqrt(y)`
8. To find the value of y for the equation $xy - y^2 - 5x + 7 = 0$, we use the command
 `>>solve('x*y-y^2-5*x+7','x')`
9. We can find a root of x^5+x^3+3 around -1 using the Matlab command
 `>> f = x^5+x^3+3`
 `>> fzero(f,-1)`
10. The plot command in Matlab can be used to plot multiple curves within the same figure.
11. Matlab command for $y = 3(\cos x + 2)$ when $x = 2$ is
 `x=2;`
 `y=3*(cos x+2)`
12. In open methods for finding roots of nonlinear equations, the method starts with one or more initial guess points.

Please, see the next page,,,,,,,,,

13. The false position method is an iterative process that reduces the interval size by half at each iteration.
14. Secant method is an open method and it is always convergent.
15. Simpson rule method is used to approximate the integral as quadratic approximation.

✦ The following Matlab code uses the bisection method to find a root of the equation $x^3 - 2x - 3 = 0$ in the interval $[0, 2]$ with $n=10$ and $\text{tol}=0.001$. Answer the following five questions from 16-20.

```
-----
function c = mybisection(a,b,tol,n)
f=.....①.....;
for i=1:n
.....②.....;
if abs (f (c))<tol
return
.....③..... f (a)*f (c)<0
b=c;
else
a=c;
end
end
-----
```

16. In the Matlab code for the bisection method, the initial interval $[a, b]$ must contain the root of the equation.
17. The correct way to write the function in place ① is x^3-2x-3 .
18. The appropriate command in place number ② is $c=(a+b)/n$.
19. The appropriate statement in the position ③ is " elseif "
20. In the presented Matlab code, the correct way to call the function is $\text{function c}=(0,2,0.001,10)$.

----- End of Questions with My Best Wishes for Success -----



Dr. Shereen Ali Mohammed ElSayed

Notes: Exam consists of 6 pages, Solve all questions

Question No. 1: Indicate whether the sentence or statement is true or false (15marks)

1. The quality control of steel structures is more guaranteed than concrete structures.
2. Modulus of Rupture equal 12-20 % of tensile strength.
3. C_3A causes many problems in cement, and it can be eliminated
4. In traditional concrete, the failure occurred in the cement paste
5. Plastic shrinkage occurs after 24 hours of concrete casting
6. Creep is defined as the decrease in strain under a sustained constant stress after considering other time-dependent deformations.
7. Around 75% of concrete shrinkage occurred during the first year of concrete age.
8. Concrete is considered as a permeable material by nature.
9. Consistency is one of the main properties for hardened concrete
10. Both slump test & Schmidt hammer are non-destructive testing of concrete.
11. Concrete is made with several types of cement and may contain pozzolan & admixtures
12. Fresh concrete has the ability to take the form of any desired shape.
13. Coarse aggregate means sand + cement while fine aggregate means sand only.
14. Concrete can't be mixed manually
15. The start of Fresh concrete phase is by the initial setting time.
16. The hardened concrete ended by the final setting time
17. Consistency refers to the degree of wetness, it refers to Relative Fluidity means the percentage between water quantity and the dry material volume, so it can't be dry
18. Slump test can be used to measure fresh concrete properties
19. Size of aggregate is one of the Factors that affecting on workability
20. Compacting factor test can be used to determine Concrete workability
21. Compressive strength of concrete is one of the green concrete properties
22. Mechanical Concrete mixing is done only in ready mix plants
23. High compressive strength concrete can't reach 1000 kg/cm^2

24. The quality of concrete depends on many factors such as cement quality
25. Cement Paste = Cement + Water + small aggregate
26. Using clean aggregate is an important factor while mixing concrete.
27. If Cement / Aggregate ratio is 1:6 so it is rich concrete mix while if the ratio reached 1:4 the mix become so poor
28. In High strength concrete, the failure occurred in the cement paste
29. Plastic shrinkage occurs after 24 hours of concrete casting
30. Water cement ratio & weather has an impact on autogenous shrinkage.

Question No. 2: Multiple Choice, choose the appropriate answer "Just write in the answer paper the question's no. and the letter of the answer A, B, C, D or E (10 mark)

1. Concrete mainly consists of

- A. cement
- B. aggregates
- C. admixture
- D. water
- E. all the above.

2. Mortar is:

- A. Cement + Gravel
- B. Cement + water + Gravel
- C. Fine Aggregate + Gravel + water
- D. Cement paste + Sand
- E. None of these.

3. Since adding water, the Concrete passes with the following main phases:

- A. Fresh Concrete + Green Concrete
- B. Hardened Concrete + Fresh Concrete
- C. Preparation phase + Green Concrete
- D. Fresh Concrete + Green Concrete + Hardened Concrete
- E. None of these

4. The main properties for fresh concrete:

- A. Consistency
- B. Segregation

- C. Workability
 - D. Bleeding
 - E. All the above
5. Slump shape may be:
- A. Flow
 - B. Shear
 - C. True
 - D. All the above
 - E. None of these
6. Concrete grade 350 Kg/cm² includes around of cement:
- A. 350 kg
 - B. 150 kg
 - C. 350 g
 - D. 3 bags
 - E. 450 kg
7. Pick up the incorrect statement from the following:
- A. Tricalcium silicate (C₃S) hydrates rapidly
 - B. Tricalcium silicate (C₃S) generates more heat of hydration
 - C. Tricalcium silicate (C₃S) develops early strength
 - D. Tricalcium silicate (C₃S) has more resistance to sulphate attack
 - E. None of these.
8. The heat of hydration of cement is dependent on:
- A. Composition of cement
 - B. Fineness of cement
 - C. Temperature
 - D. All of the above
 - E. None of these
9. Water cement ratio is
- A. volume of water to that of cement
 - B. volume of concrete to that of water
 - C. weight of concrete to that of water

- D. weight of water to that of cement.
- E. both (a) and (d) of the above.

10. Pick up the correct statement from the following:

- A. Water enables chemical reaction to take place with cement
- B. Aggregate is not required for the hydration of cement
- C. Water is not required for hydration of cement
- D. Strength of concrete structure doesn't depend upon cement
- E. Both (a) and (b) of the above.

11. High strength concrete may has grade = kg/cm^2

- A. 200
- B. 225
- C. 275
- D. 350
- E. 700

12. Pick up the correct statement from the following:

- A. Segregation is necessary for a workable concrete
- B. Consistency does not affect the workability of concrete
- C. If the slump increases, workability decreases
- D. If the concrete mix is dry, the slump is maximum
- E. None of these.

13. Permissible compressive strength of M 300 concrete grade is

- A. 100 kg/cm^2
- B. 150 kg/cm^2
- C. 200 kg/cm^2
- D. 250 kg/cm^2
- E. 300 kg/cm^2

14. The factor which affects workability, is

- A. water content and its temperature
- B. shape and size of the aggregates
- C. grading and surface textures of the aggregates
- D. air entraining agents
- E. all the above.

15. Pick up the correct statement from the following:

- A. An increase in water content must be accompanied by an increase in cement content
- B. Angular and rough aggregates reduce the workability of the concrete
- C. Large size aggregates increase the workability due to lesser surface area
- D. The slump of the concrete mix decreases due to an increase in temperature
- E. All the above.

16. Higher workability of concrete is required if the structure is

- A. made with cement concrete
- B. thick and reinforced
- C. thin and heavily reinforced
- D. thick and heavily reinforced.
- E. None of these

17. Shrinkage:

- A. Occurs in Concrete when it got hardened in air
- B. It causes problems in concrete in all causes
- C. Drying shrinkage is not affected by concrete mix components
- D. All of the above
- E. None of these

18. Creep:

- A. is a time dependent
- B. value decreased as compressive strength increased
- C. is affected by cement type
- D. All of the above
- E. None of these

19. Durability:

- A. is concrete resistance against deterioration
- B. includes concrete resistance for absorption and permeability
- C. is affected by cement type
- D. All of the above
- E. None of these

20. Pick up the incorrect statement from the following:

- A. Water cement paste hardens due to hydration
- B. During hardening cement binds the aggregates together
- C. Cement provides strength, durability and water tightness to the concrete
- D. Water cement ratio has no impact on concrete compressive strength
- E. All the above.

Question no. 3: Essay (20 mark)

a. Write notes about

- 1. Types of concrete shrinkage (including definitions, reasons and influencing factors)
- 2. Non-Destructive testing of concrete (including definition, Applications & state two examples).
- 3. Creep (Illustrative drawings are necessary)

b. Differentiate between:

- 1. Permeability & Absorption
- 2. Concrete grades 800 Kg/cm^2 & 300 Kg/cm^2
- 3. Bending & Shear Strength

Question No. 4: Problem solving (5 marks)

Design the concrete mix by weight & volume using absolute volume method, considering the below information:

- The fresh concrete consistency is Plastic
- Consider water cement ratio = 45%
- The needed compressive strength after 28 days = 300 kg/cm^2
- The passed percentage of aggregate through sieve 3/16 = 30%
- Specific weight of cement = 3.15
- Specific weight of aggregate (sand & gravel) = 2.65
- Volumetric weight of aggregate (sand & gravel) = 1700 Kg/cm^2

"اَسْتَعِيْنْ بِاللّٰهِ وَلَا تَعْجِزْ"
الامتحان ست (٦) صفحات - الإجابة في نفس الصفحة

Answer the following questions

Q1. Suppose a is a double variable, choose the correct answers: (10 Marks)

1. the conditional statement

$boolean\ action = a < 0 ? a > 10 ? true : false : false;$

assigns to **$action$**

- (a) **false** value if a is only positive less than or equal 10 (b) **false** value for any a .
(c) **true** value if a is only positive greater than 10 (d) None of the mentioned

2. the conditional statement

$boolean\ action = a > 0 ? a > 10 ? true : false : true;$

assigns to **$action$**

- (a) **false** value if a is any positive (b) **false** value if a is only positive less than or equal 10
(c) **true** value if a is only positive less than 10 (d) None of the mentioned

3. the conditional statement

$boolean\ action = a < 0 ? a > 10 ? false : false : true;$

assigns to **$action$**

- (a) **false** value if a is only equal zero (b) **true** value if a is any positive
(c) **true** value if a is only positive greater than 10 (d) None of the mentioned

4. the conditional statement

$boolean\ action = a < 10 ? a > 0 ? true : false : false;$

assigns to **$action$**

- (a) **false** value if a is negative (b) **false** value if a is positive greater than or equal 10
(c) **true** value if a is only positive less than 10 (d) All of the mentioned

5. the conditional statement

$boolean\ action = a > 10 ? a > 0 ? true : false : false;$

assigns to **$action$**

- (a) **false** value if a is negative (b) **false** value if a is positive less than or equal 10
(c) **true** value if a is positive greater than 10 (d) All of the mentioned

Q2: # Design the class named **Polygon** which contains the following:

(10 Marks)

- A **property** named **N** (stands for number of **sides**)
- a function named **angleSum** without parameters, to return the sum of polygon angles which given from the formula:

$$\text{sum of polygon angles} = 180 (N - 2)$$

Create new three classes named **Tri**, **Quad**, and **Pent** (مثلث ومربع ومخمس) that inherit the polygon class.

In main class:

- create one-dimensional array of three reference objects of class polygon
- make each previous reference to point an object from **Tri**, **Quad**, and **Pent** classes
- using **for** statement, compute the sum of angles of each object from **Tri**, **Quad**, **Pent** (firstly, you should assign number of sides of each object in the same **for**)

3: State the errors in few words, with correction:

(10 Marks)

1.

```
using System;
class Program : I1, I2
{
    static void Main(string[] args)
    {
        Program p1 = new Program();
        p1.pnt1();
        p1.pnt2();
    }
}
interface I1 { void pnt1(); }
interface I2 { void pnt2(); }
```

2.

```
using System;
public delegate void mydel(int n1);
class Program
{
    static void Main(string[] args)
    {
        mydel del;
        del = new mydel(f1);
        Console.WriteLine(del(10));
        del = new mydel(f2);
        Console.WriteLine(del(10));
    }
    public static int f1(int a) { return a * a; }
    public static int f2(int c) { return 2 * c; }
}
```

3.

```
using System;
class Program
{
    static void Main(string[] args)
    {
        person p1 = new person();
    }
}
class person
{
    string Name;
    int age;
    public person(string st, int g) { Name = st; age = g; }
}
```

4.

```
using System;
class Program
{
    static void Main(string[] args)
    {
        A a = new A();
        a.pnt();
    }
}
class A:B,C
{
}
class B
{
}
class C
{
    public void pnt() { Console.WriteLine("Class C: "); }
}
```


4: Complete the missing parts in the following program which includes the class named **point**, this class contains

- two fields named **Xcoord** and **Ycoord**.
- constructor with two arguments to initialize the fields.
- the function named **dist()** with a single argument from the **point** type, and return the distance between two objects from the class **point**. $\text{dist}(p1, p2) = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$ if $P_1(x_1, x_2)$, $P_2(x_2, y_2)$
- in the **Main** function, create the two objects **P1** and **P2** with optional initial values and call the function **dist()** by the second object to compute the Euclidean distance between the two points and print the result.

Remark: use the functions **Math.sqrt()** to compute the square root, **Math.pow()** to compute the 2 power.

(10 Marks)

```
using System;
class Program
{
    static void Main(string[] args)
    {
        point p1 = .....; //create p1 object
        point p2 = .....; //create p2 object
        Console.WriteLine(.....); //call dist() function
    }
}
class point
{
    double Xcoord;
    double Ycoord;
    public point(double X, double Y)
    {
        .....
        .....
        .....
    }
    public double dist(point S)
    {
        .....
        .....
        .....
        .....
        .....
    }
}
```

Q5:

The screenshot shows a Windows Form titled 'Form1'. It has three text boxes: 'First' (labeled 'First No.'), 'Second' (labeled 'Second No.'), and 'Result' (labeled 'The Result'). Below these is a button labeled 'ADD'. At the bottom left is a label 'HELLO'.

The form you see contains three text boxes named, **textBox1**, **textBox2**, and **textBox3**, with their labels **First No.**, **Second No.**, and **The Result**, respectively. Also, the form contains a single button with name **button1** and text, **ADD**.

Also, label4 with text **HELLO**

Complete the subs below to make the button, **button1** take the content of the **textBox1** and **textBox2** and sum them and show the result in the **textBox3**.

Also, make the label4 with text “**HELLO**” to move from left side to right side of the **form1** if the content of **textBox3** exceeds the value **10**.
(10 Marks)

```
public partial class Form1 : Form
{
    public Form1()
    {
        InitializeComponent();
        //do not activate the timer1 tool
        .....
    }

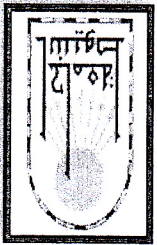
    private void button1_Click(object sender, EventArgs e)
    {
        //assign the sum of textBox1 content and textBox2 content to the
        //textBox3 content
        .....
        //activate the timer1 tool
        .....
    }

    private void timer1_Tick(object sender, EventArgs e)
    {
        //apply the mentioned condition to move HELLO
        .....
        .....
        .....
    }
}
```

End of Exam, with my best wishes:

Dr- Abdel-Rahiem Ahmed Hashem Mohammed

د. عبدالرحيم أحمد هاشم محمد

	Dept. of Electrical Eng. Faculty of Engineering Assiut University Final Exam June, 2023	Elec. Eng. Program Course : Micro processor 4 th Science Time : Hours Mark : 50	
---	---	--	---

Chose the Correct Answer the Following Questions (Total 50 Marks):

1. What is Microprocessor?

- a) A multipurpose PLD that accepts binary data as input
- b) A multipurpose PLD that accepts an integer as input
- c) A multipurpose PLD that accepts whole numbers as input
- d) A multipurpose PLD that accepts prime numbers as input

Answer:

2. Which of the following is correct about 8086 microprocessor?

- a) Intel's first x86 processor
- b) Motrola's first x86 processor
- c) STMICROELECTRONICS's first x86 processor
- d) NanoXplore x86 processor

Answer:

3. Which of the following is a type of microprocessor?

- a) CISC
- b) RISC
- c) EPIC
- d) All of the mentioned

Answer:

4. The microprocessor of a computer can operate on any information if it is present in _____ only.

- a) Program Counter
- b) Flag
- c) Main Memory
- d) Secondary Memory

Answer:

5. Which of the following technology was used by Intel to design its first 8-bit microprocessor?

- a) NMOS
- b) HMOS
- c) PMOS
- d) TTL

6. Which of the following addressing method does the instruction, MOV AX,[BX] represent?

- a) register indirect addressing mode
- b) direct addressing mode
- c) register addressing mode

d) register relative addressing mode

Answer

7. What is the word length of an 8-bit microprocessor?

- a) 8-bits – 64 bits
- b) 4-bits – 32 bits
- c) 8-bits – 16 bits
- d) 8-bits – 32 bits

Answer

8. In 8-bit microprocessor, how many opcodes are present?

- a) 246
- b) 278
- c) 250
- d) 256

Answer

9. Which of the following is not true about the address bus?

- a) It consists of control PIN 21 to 28
- b) It is a bidirectional bus
- c) It is 16 bits in length
- d) Lower address bus lines ($AD_0 - AD_7$) are called "Line number"

Answer

10. Which of the following is true about microprocessors?

- a) It has an internal memory
- b) It has interfacing circuits
- c) It contains ALU, CU, and registers
- d) It uses Harvard architecture

Answer

11. Which of the following is the correct sequence of operations in a microprocessor?

- a) Opcode fetch, memory read, memory write, I/O read, I/O write
- b) Opcode fetch, memory write, memory read, I/O read, I/O write
- c) I/O read, opcode fetch, memory read, memory write, I/O write
- d) I/O read, opcode fetch, memory write, memory read, I/O write

Answer

12. Which of the following is not a microprocessor?

- a) Z8000
- b) Motorola 6809
- c) Zilog Z8
- d) PIC1x

Answer

13. Which of the following is not a property of TRAP interrupt in microprocessor?

- a) It is a non-maskable interrupt
- b) It is of highest priority
- c) It uses edge-triggered signal
- d) It is a vectored interrupt

Answer

14. Which of the following is a property of RST 7.5 interrupt?

- a) It is a non-maskable interrupt
- b) It has 3rd highest priority
- c) It uses level-triggered signal
- d) Its vectored address is 003C H

Answer

15. Which of the following flag is used to mask INTR interrupt?

- a) zero flag
- b) auxiliary carry flag
- c) interrupt flag
- d) sign flag

Answer

16. Which of the following is a special-purpose register of microprocessor?

- a) Program counter
- b) Instruction register
- c) Accumulator
- d) Temporary register

Answer

17. Which of the following circuit is used as a special signal to demultiplex the address bus and data bus?

- a) Priority Encoder
- b) Decoder
- c) Address Latch Enable
- d) Demultiplexer

View Answer

18. How many flip-flops are there in a flag register of 8085 microprocessor?

- a) 4
- b) 5
- c) 7
- d) 10

Answer

19. Which of the following flag condition is used for BCD arithmetic operations in microprocessor?

- a) Sign flag
- b) Auxiliary carry flag
- c) Parity flag
- d) Zero flag

Answer

20. Whenever a non-maskable interrupt occurs in 8085 microprocessor, which of the following data line contains the data?

- a) 2C H
- b) 3C H
- c) 36 H
- d) 24 H

Answer

21. The _____ directive instructs the assembler to begin memory allocation for a segment/block/code from the stated address.

- a) GROUP
- b) OFFSET
- c) ORG
- d) LABEL

Answer

22. How many address lines are present in 8086 microprocessor?

- a) 16
- b) 20
- c) 32
- d) 40

Answer

23. Which of the following is not a status flag in microprocessor?

- a) Overflow flag
- b) Direction flag
- c) Interrupt flag
- d) Index flag

Answer

24. Which of the following is not a condition flag?

- a) Trap flag
- b) Auxiliary carry flag
- c) Parity flag
- d) Zero flag

Answer

25. Which of the following register is not used in opcode fetch operations?

- a) Program counter
- b) Memory address register
- c) Memory data register
- d) Flag register

Answer

26. A memory connected to a microprocessor has 20 address lines and 16 data lines. What will be the memory capacity?

- a) 8 KB
- b) 2 MB
- c) 16 MB
- d) 64 KB

Answer

27. What is the word length of the Pentium-II microprocessor?

- a) 8-bit
- b) 32-bit
- c) 64-bit
- d) 16-bit

Answer

28. Which of the following is not true about 8085 microprocessor?

- a) It is an 8-bit microprocessor

- b) It is a 40 pin DIP chip
- c) It is manufactured using PMOS technology
- d) It has 16 address lines

Answer

29. Which of the following is a non-vectorized input?

- a) TRAP
- b) RST-7.5
- c) RST-6.5
- d) INTR

Answer

30. Which of the following is true?

- a) Every instruction has two parts i.e. opcode and operands
- b) MOV B, C is a two-byte instruction
- c) MVI A, 90H is a three-byte instruction
- d) Maximum number of T-states possible for the execution of an instruction is 16

Answer

31. Which of the following addressing mode is used by 8085 microprocessor for array and list operations?

- a) Base-Register
- b) Direct
- c) Indexed
- d) Immediate

Answer

32. What is stored in the H & L general-purpose register?

- a) Opcode
- b) Address of memory
- c) Address of next instruction
- d) Temporary data

Answer

33. If a 90 GB memory has to be connected to a microprocessor, minimum how many address lines are required?

- a) 36
- b) 39
- c) 32
- d) 37

Answer

34. Which of the following is a software interrupt?

- a) TRAP
- b) INTR
- c) RST-6.5
- d) RST-5

Answer

35. What is the vectored address of RST-5?

- a) 0010 H
- b) 0032 H

- c) 0028 H
- d) 0030 H

Answer

36. Which of the following is true about stack pointer?

- a) Stack pointer contains the address of the top of the stack memory
- b) Stack pointer is an 8-bit register
- c) Stack pointer stores data permanently
- d) Stack pointer is initialized after stack operation

Answer

37. How many address lines are required to connect a 4 KB RAM to a microprocessor?

- a) 10
- b) 16
- c) 12
- d) 20

Answer

38. Which of the following is true about MOV A, B instruction?

- a) It means move the content of register A to register B
- b) It uses immediate addressing mode
- c) It doesn't affect the flag register
- d) It is a 2-byte instruction

Answer

39. Which of the following is false about LDA instruction?

- a) It is a 3-byte instruction
- b) It uses indirect addressing mode
- c) It has 13 T-states
- d) It doesn't affect any flags

Answer

40. Which of the following is true about STA instruction?

- a) It uses immediate addressing mode
- b) It is a 3-byte instruction
- c) It required three machine cycles
- d) Accumulator is loaded with the content of memory

Answer

41. DAA instruction is used to perform which type of addition?

- a) BCD addition
- b) Excess-3 addition
- c) Binary addition
- d) Octal addition

Answer

42. What does a loader do in a microprocessor?

- a) Converts hexadecimal code to binary
- b) Converts decimal to binary
- c) Increments the content of the program counter by 1
- d) Decodes an opcode

Answer

43. What is stored in the H & L general-purpose register?

- a) Opcode
- b) Address of memory
- c) Address of next instruction
- d) Temporary data

Answer

44. If a 90 GB memory has to be connected to a microprocessor, minimum how many address lines are required?

- a) 36
- b) 39
- c) 32
- d) 37

Answer

45. Which of the following is a software interrupt?

- a) TRAP
- b) INTR
- c) RST-6.5
- d) RST-5

Answer

46. What is the vectored address of RST-5?

- a) 0010 H
- b) 0032 H
- c) 0028 H
- d) 0030 H

Answer

47. Which of the following is true about stack pointer?

- a) Stack pointer contains the address of the top of the stack memory
- b) Stack pointer is an 8-bit register
- c) Stack pointer stores data permanently
- d) Stack pointer is initialized after stack operation

Answer

48. How many address lines are required to connect a 4 KB RAM to a microprocessor?

- a) 10
- b) 16
- c) 12
- d) 20

Answer

49. Which of the following is true about MOV A, B instruction?

- a) It means move the content of register A to register B
- b) It uses immediate addressing mode
- c) It doesn't affect the flag register
- d) It is a 2-byte instruction

Answer

50. Which of the following is false about LDA instruction?

- a) It is a 3-byte instruction
- b) It uses indirect addressing mode
- c) It has 13 T-states
- d) It doesn't affect any flags

Answer



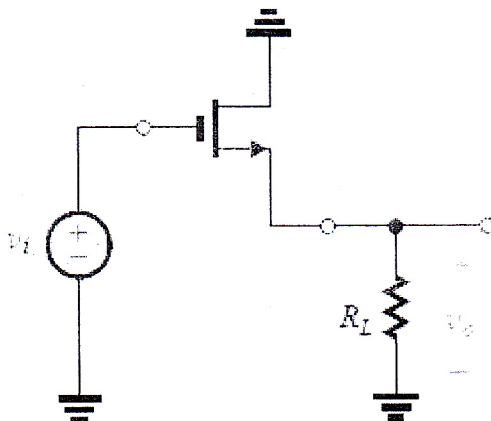
Dept. of Electrical
Eng.
Faculty of
Engineering
Assiut University
Final Exam
June, 2023

Elec. Eng. Program
Course : Electronics
4th Science
Time : Hours
Mark : 100

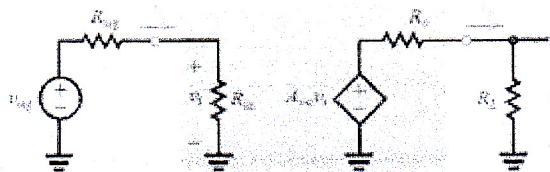


Chose the Correct Answer the Following Questions (Total 100 Marks):

1. In which of the following configuration does a MOSFET works as an amplifier?
a) Common Source (CS)
b) Common Gate (CG)
c) Common drain (CD)
d) All of the mentioned
2. The MOSFET in the following circuit is in which configuration?



- a) Common Source (CS)
b) Common Gate (CG)
c) Common Drain (CD)
d) None of the mentioned
3. The circuit below is the characterization for the amplifier as a functional block. If the value of R_{in} for the common source configuration is R_1 and that for common source with a source resistance configuration is R_2 ideally. The ratio of R_1/R_2 will be



- a) $R_1/R_2 = 1$
b) $0 < R_1/R_2 < 1$

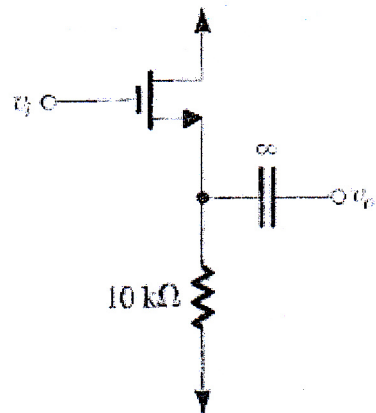
- c) $R_1/R_2 > 1$
d) $R_1/R_2 = 0$
4. Which of the following is the necessary to hold drain current in 0 for n channel E-MOSFET?
a) $V_{gs} > V_t$
b) $V_{gs} < V_t$
c) $V_{gs} < 2V_t$
d) $2V_{gs} > V_t$
5. MOSFET can be used as _____
a) Voltage controlled capacitor
b) Current controlled capacitor
c) Voltage controlled inductor
d) Current controlled inductor
6. In which region does BJT act as the OFF switch in electronic circuits?
a) Cut-off
b) Saturation
c) Active
d) Reverse saturation
7. Which of the following type of transistor is preferred in digital and analog electronic circuits?
a) BJT
b) JFET
c) MOSFET
d) FET
8. Buffer amplifier needs to have
a) Low input resistance and low output resistance
b) High Input resistance and high output resistance
c) Low input resistance and high output resistance
d) High input resistance and low output resistance
9. An amplifier has a voltage gain of 40db. The value of A_{vo} is
a) 10
b) 100
c) 20
d) 200
10. Which of the following is true about Common Drain amplifier?
a) It has low input impedance
b) It has high output impedance
c) Infinite gain
d) Output will be same as input

11. Which of the following is the other name for Common Drain Amplifier?

- a) Source Follower
- b) Current Booster
- c) Voltage booster
- d) Voltage limiter

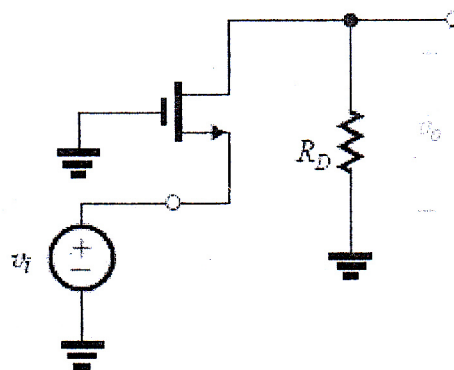
12. The NMOS transistor in source follower circuit shown has $g_m = 5\text{mA/V}$ and a large r_o . Find the output resistance.

- a) $0.1\text{ k}\Omega$
- b) $0.2\text{ k}\Omega$
- c) $0.3\text{ k}\Omega$
- d) $0.4\text{ k}\Omega$



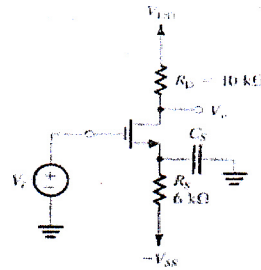
13. The MOSFET in the following circuit is in which configuration

- a) Common Source (CS)
- b) Common Gate (CG)
- c) Common Drain (CD)
- d) None of the mentioned



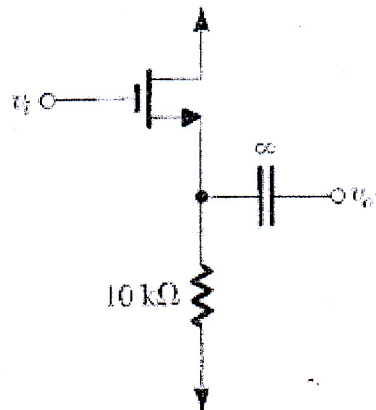
14. The amplifier in the figure shown below is biased to operate at $I_D = 1\text{mA}$ and $g_m = 1\text{mA/V}$. Find the midband gain

- a) 0.43 V/V
- b) 1.43 V/V
- c) 2.43 V/V
- d) 3.43 V/V



15. The NMOS transistor in source follower circuit shown has $g_m = 5\text{mA/V}$ and a large r_0 . Find the output resistance.

- a) 0.1 kΩ
- b) 0.2 kΩ
- c) 0.3 kΩ
- d) 0.4 kΩ



16. Which of the following is true about MOSFET

- a) There is no direction between channel and gate terminal
- b) There exists a channel and gate short connection
- c) Channel is not present and cannot be created
- d) They have low input impedance

17. Which of the following is true about the common Source amplifier?

- a) It has low input impedance
- b) It has high output impedance

- c) Infinite gain
- d) Phase reversal voltage output

18. What are the working regions of a unijunction transistor

- a) Linear region
- b) Negative Resistance region
- c) Saturation region
- d) Cut-off region

19. What is the function of the bypass capacitor in a common-emitter cascode circuit?

- a) To provide a low input capacitance
- b) To provide a high output impedance
- c) To provide a low output impedance
- d) To provide a high input capacitance

20. Which of the following is an advantage of a common-base cascode over a common-emitter cascode?

- a) Higher gain
- b) Lower output impedance
- c) Lower input impedance
- d) Higher bandwidth

21. What is the function of the coupling capacitor in a cascode transistor circuit?

- a) To block DC voltage
- b) To provide a low input capacitance
- c) To provide a high output impedance
- d) To provide a low output impedance

22. What is the purpose of the first transistor in a cascode circuit?

- a) To amplify the input signal
- b) To provide a high output impedance
- c) To provide a low input capacitance
- d) Both a and c

23. In which of the following transistor topologies is the output signal taken from the emitter?

- a. Common emitter

- b. Common base
- c. Common collector
- d. All of the above

24. Which of the following transistor topologies has a voltage gain less than unity?

- a) Common emitter
- b) Common base
- c) Common collector
- d) None of the above

25. What is the name of the topology that is commonly used for MOSFET Double Cascoding?

- a) Common source
- b) Common gate
- c) Common drain
- d) Common collector

 جامعة اسيوط	Assiut University Faculty of Science Jun.2023	الامتحان لطلاب السنة 4 Course: Computer Architectures Time: Hours Marks: <u>50</u>	كلية العلوم
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Answer the following questions

Choose the correct answer

1. The _____ format is usually used to store data.

- a) BCD
- b) Decimal
- c) Hexadecimal
- d) Octal

Answer:

2. The 8-bit encoding format used to store data in a computer is _____

- a) ASCII
- b) EBCDIC
- c) ANCI
- d) USCII

Answer:

3. A source program is usually in _____

- a) Assembly language
- b) Machine level language
- c) High-level language
- d) Natural language

Answer:

4. Which memory device is generally made of semiconductors?

- a) RAM
- b) Hard-disk
- c) Floppy disk
- d) Cd disk

Answer:

5. The ALU makes use of _____ to store the intermediate results.

- a) Accumulators
- b) Registers
- c) Heap
- d) Stack

Answer:

6. _____ are numbers and encoded characters, generally used as operands.

- a) Input
- b) Data
- c) Information
- d) Stored Values

Answer:

7. _____ bus structure is usually used to connect I/O devices.

- a) Single bus
- b) Multiple bus
- c) Star bus
- d) Rambus

Answer:

8. The I/O interface required to connect the I/O device to the bus consists of _____

- a) Address decoder and registers
- b) Control circuits
- c) Address decoder, registers and Control circuits
- d) Only Control circuits

Answer:

9. _____ is generally used to increase the apparent size of physical memory.

- a) Secondary memory
- b) Virtual memory
- c) Hard-disk
- d) Disks

Answer:

10. The time delay between two successive initiations of memory operation

- a) Memory access time
- b) Memory search time

c) Memory cycle time

d) Instruction delay

Answer:

11. The decoded instruction is stored in _____

a) IR

b) PC

c) Registers

d) MDR

Answer:

12. The instruction -> Add LOCA, R0 does _____

a) Adds the value of LOCA to R0 and stores in the temp register

b) Adds the value of R0 to the address of LOCA

c) Adds the values of both LOCA and R0 and stores it in R0

d) Adds the value of LOCA with a value in accumulator and stores it in R0

Answer:

13. Which registers can interact with the secondary storage?

a) MAR

b) PC

c) IR

d) R0

Answer:

14. During the execution of a program which gets initialized first?

a) MDR

b) IR

c) PC

d) MAR

Answer:

15. Which of the register/s of the processor is/are connected to Memory Bus?

a) PC

b) MAR

c) IR

d) Both PC and MAR

Answer:

16. ISP stands for _____

a) Instruction Set Processor

b) Information Standard Processing

c) Interchange Standard Protocol

d) Interrupt Service Procedure

Answer:

17. The internal components of the processor are connected by _____

a) Processor intra-connectivity circuitry

b) Processor bus

c) Memory bus

d) Rambus

Answer:

18. _____ is used to choose between incrementing the PC or performing ALU operations.

a) Conditional codes

b) Multiplexer

c) Control unit

d) None of the mentioned

Answer:

19. The registers, ALU and the interconnection between them are collectively called as _____

a) process route

b) information trail

c) information path

d) data path

Answer:

20. _____ is used to store data in registers.

a) D flip flop

b) JK flip flop

c) RS flip flop

d) None of the mentioned

Answer:

21. The main virtue for using single Bus structure is _____

a) Fast data transfers

b) Cost effective connectivity and speed

c) Cost effective connectivity and ease of attaching peripheral devices

d) None of the mentioned

Answer:

22. _____ are used to overcome the difference in data transfer speeds of various devices.

- a) Speed enhancing circuitry
- b) Bridge circuits
- c) Multiple Buses
- d) Buffer registers

Answer:

23. To extend the connectivity of the processor bus we use _____

- a) PCI bus
- b) SCSI bus
- c) Controllers
- d) Multiple bus

Answer:

24. IBM developed a bus standard for their line of computers 'PC AT' called _____

- a) IB bus
- b) M-bus
- c) ISA
- d) None of the mentioned

Answer:

25. The bus used to connect the monitor to the CPU is _____

- a) PCI bus
- b) SCSI bus
- c) Memory bus
- d) Rambus

Answer:

26. ANSI stands for _____

- a) American National Standards Institute
- b) American National Standard Interface
- c) American Network Standard Interfacing
- d) American Network Security Interrupt

Answer:

27. _____ register Connected to the Processor bus is a single-way transfer capable.

- a) PC
- b) IR
- c) Temp
- d) Z

Answer:

28. In multiple Bus organisation, the registers are collectively placed and referred as _____

- a) Set registers
- b) Register file
- c) Register Block
- d) Map registers

Answer:

29. The main advantage of multiple bus organisation over a single bus is _____

- a) Reduction in the number of cycles for execution
- b) Increase in size of the registers
- c) Better Connectivity
- d) None of the mentioned

Answer:

30. The ISA standard Buses are used to connect _____

- a) RAM and processor
- b) GPU and processor
- c) Harddisk and Processor
- d) CD/DVD drives and Processor

Answer:

31. The duration between the read and the mfc signal is _____

- a) Access time
- b) Latency
- c) Delay
- d) Cycle time

Answer:

32. The minimum time delay between two successive memory read operations is _____

- a) Cycle time
- b) Latency
- c) Delay
- d) None of the mentioned

Answer:

33. _____ is the bottleneck, when it comes computer performance.

- a) Memory access time
- b) Memory cycle time
- c) Delay
- d) Latency

Answer:

34. VLSI stands for _____

- a) Very Large Scale Integration
- b) Very Large Stand-alone Integration
- c) Volatile Layer System Interface
- d) None of the mentioned

Answer:

35. A memory organisation that can hold upto 1024 bits and has a minimum of 10 address lines can be organized into _____

- a) 128 X 8
- b) 256 X 4
- c) 512 X 2
- d) 1024 X 1

Answer:

36. The RAMBUS requires specially designed memory chips similar to _____

- a) SRAM
- b) SDRAM
- c) DRAM
- d) DDRAM

Answer:

37. The reason for the implementation of the cache memory is _____

- a) To increase the internal memory of the system
- b) The difference in speeds of operation of the processor and memory
- c) To reduce the memory access and cycle time
- d) All of the mentioned

Answer:

38. To overcome the slow operating speeds of the secondary memory we make use of faster flash drives.

- a) True
- b) False

Answer:

39. The fastest data access is provided using _____

- a) Caches
- b) DRAM's
- c) SRAM's
- d) Registers

Answer:

40. The memory which is used to store the copy of data or instructions stored in larger memories, inside the CPU is called _____

- a) Level 1 cache
- b) Level 2 cache
- c) Registers
- d) TLB

Answer:

41. In memory-mapped I/O _____

- a) The I/O devices and the memory share the same address space
- b) The I/O devices have a separate address space
- c) The memory and I/O devices have an associated address space
- d) A part of the memory is specifically set aside for the I/O operation

Answer:

42. The method of synchronising the processor with the I/O device in which the device sends a signal when it is ready is?

- a) Exceptions
- b) Signal handling
- c) Interrupts
- d) DMA

Answer:

43. The method which offers higher speeds of I/O transfers is _____

- a) Interrupts
- b) Memory mapping
- c) Program-controlled I/O
- d) DMA

Answer:

44. The interrupt-request line is a part of the _____

- a) Data line
- b) Control line
- c) Address line
- d) None of the mentioned

Answer:

45. The time between the receiver of an interrupt and its service is _____

- a) Interrupt delay
- b) Interrupt latency
- c) Cycle time
- d) Switching time

Answer:

46. A single Interrupt line can be used to service n different devices.

- a) True
- b) False

Answer:

47. The 8085 microprocessor responds to the presence of an interrupt

- a) As soon as the trap pin becomes 'LOW'

- b) By checking the trap pin for 'high' status at the end of each instruction fetch

- c) By checking the trap pin for 'high' status at the end of execution of each instruction

- d) By checking the trap pin for 'high' status at regular intervals

Answer:

48. The code sent by the device in vectored interrupt is _____ long.

- a) upto 16 bits
- b) upto 32 bits
- c) upto 24 bits
- d) 4-8 bits

Answer:

49. We describe a protocol of input device communication below:

- i) Each device has a distinct address.

- ii) The BUS controller scans each device in a sequence of increasing address value to determine if the entity wishes to communicate

- iii) The device ready to communicate leaves its data in the I/O register

- iv) The data is picked up and the controller moves to the step a

Identify the form of communication best describes the I/O mode amongst the following.

- a) Programmed mode of data transfer
- b) DMA
- c) Interrupt mode
- d) Polling

Answer:

50. _____ register is used for the purpose of controlling the status of each interrupt request in parallel priority interrupt.

- a) Mass
- b) Mark
- c) Make
- d) Mask

Answer:

		
التاريخ: ٥ يونيو ٢٠٢٣ م	مقرر: قضايا مجتمعية للعام الجامعي: (٢٠٢٢ / ٢٠٢٣)	كلية العلوم- الفرقة الثانية

• إسم الطالب:

الرقم الأكاديمي:

{درجة لكل مفردة}

❖ أولاً : ظلل (T) إذا كانت العبارة صحيحة وظلل (F) إذا كانت العبارة غير صحيحة :

- (١) تستطيع الدولة حرمان مواطنها من أحد حقوق الإنسان عن طريق قوانينها الداخلية.
- (٢) تتميز حقوق الإنسان بأنها كل لا يتجزأ ولا تقبل التصرف فيها.
- (٣) تتفق كل مواد الإعلان العالمي لحقوق الإنسان مع أحكام الشريعة الإسلامية.
- (٤) تعتبر اتفاقيات جنيف بشأن معاملة الجرحى والأسرى والمدنيين في الحروب مصدراً لحقوق الإنسان.
- (٥) تمثل حقوق الإنسان الحد الأدنى من الحقوق الذي يجب أن يتمتع به كل شخص بصفته الإنسانية.
- (٦) تختلف حقوق الإنسان باختلاف جنسية الدولة التي يحملها صاحب هذه الحقوق.
- (٧) يعد ميثاق منظمة الأمم المتحدة عام ١٩٤٥ كاتفاقية دولية عالمية مصدراً من مصادر حقوق الإنسان.
- (٨) ليس للإعلان العالمي لحقوق الإنسان صفة الإلزام القانوني للدول، وإنما مجرد قيمة أدبية معنوية فقط.
- (٩) فرض العهد الدولي للحقوق المدنية والسياسية التزاماً قانونياً مطلقاً على الدول في تنفيذ ماورد به من بنود.
- (١٠) يُعتبر الحق في السلم، الذي هو تعبير عن رفض الحروب، أحد صور الحقوق التنموية والبيئية.
- (١١) يعد تطبيق عقوبة الإعدام في بعض الجرائم في مصر اعتداءً على حق الإنسان في الحياة مما يخالف الاتفاقيات الدولية.
- (١٢) يستوجب حق الشخص في المحاكمة العادلة أن يحدد القانون مسبقاً الجرائم وعقابها "لا جريمة ولا عقوبة إلا بنص قانوني".
- (١٣) يُستثنى من حظر تعذيب الإنسان قيام شرطة الدولة بتعذيب المجرمين لدفعهم إلى الاعتراف بالجرائم.
- (١٤) تُعتبر الاستعانة بخدم المنازل إحدى صور الاستعباد والرق الذي يتعارض مع حق الإنسان في الحرية.
- (١٥) لكل شخص الحق في التمتع بالجنسية، ولا يجوز إسقاطها عنه بشكل تعسفي.
- (١٦) يعطي الحق في الحرية لصاحبه إمكانية أن ينشر ما يحلوه على مواقع التواصل الاجتماعي بشكل مطلق من أية قيود.
- (١٧) حماية للملكية الخاصة، تُحظر مصادرة الأموال كلها أو بعضها بصورة تعسفية أو غير قانونية.
- (١٨) يتمتع أي إنسان بحرية الرأي العقيدة وحرمة المسكن والأموال في مصر، سواء أكان وطنياً أم أجنبياً.
- (١٩) طبقاً لحق الإنسان في التقاضي يحق للأجنبي التقاضي أمام القضاء المصري.
- (٢٠) يقتضي حق الإنسان في التعليم أن يكون التعليم في مرحلتيه الابتدائية والأساسية مجانياً.
- (٢١) يتمتع الإنسان بالحقوق السياسية كالترشح والانتخاب في أية دولة يتواجد بها.
- (٢٢) يجوز للدولة أن تستعين بأي شخص يتواجد على أراضيها في أداء الخدمة العسكرية لديها.
- (٢٣) يجوز للدولة تأمين الأموال المملوكة للأجانب مع الالتزام بالتعويض.
- (٢٤) يقتضي حق الإنسان في المحاكمة العادلة علانية جلسات المحاكمة وإخباره بأسباب توقيفه أو اعتقاله.
- (٢٥) يعتبر العرف مصدراً هاماً من مصادر حقوق الإنسان على الصعيد الدولي.
- (٢٦) يحق لأجهزة الأمم المتحدة كمجلس الأمن أو لجنة مركز المرأة مراقبة مدى التزام الدول الأعضاء بحقوق الإنسان.
- (٢٧) يتكون مجلس الأمن -كأحد أجهزة الأمم المتحدة- من ١٥ عضواً، منهم عشرة أعضاء دائمي العضوية.
- (٢٨) ينحصر الفساد المالي والإداري في فئة الموظفين العموميين بالجهاز الإداري للدولة فقط.
- (٢٩) حصول الموظف على منافع مالية أو غيرها لشخص آخر غير لا يمثل فساداً مالياً أو إدارياً.

- (٣٠) يمثل ارتفاع معدل البطالة أحد أهم الأسباب المؤدية إلى الفساد المالي والإداري العام.
- (٣١) يعتبر الإنفاق الحكومي بما لا يعود بالنفع العام على المواطنين من الأسباب الاقتصادية للفساد المالي والإداري.
- (٣٢) لا يحق لجهاز الكسب غير المشروع محاسبة الموظف على زيادة ثروته بعد توليه الوظيفة العامة.
- (٣٣) المساءلة البرلمانية كوسيلة لمكافحة الفساد هي قيام البرلمان بتوجيه الأسئلة والاستجوابات للحكومة.
- (٣٤) معدل معرفة القراءة والكتابة عند البالغين يعكس مستوى التعليم.
- (٣٥) التنمية المستدامة هي عملية تغيير ارتقائي مخطط للهوض الشامل بجودة حياة الناس في مختلف جوانبها يتشارك فيها الناس بعدالة يتحمل أعبائها وتقاسم عوائدها.
- (٣٦) من ركائز التنمية الاجتماعية المشاركة الفاعلة لأعضاء البيئة المحلية المؤثرة في عمليات التنمية ومراحلها سواء من خلال التفكير أو الإعداد والعمل حتى المتابعة والتقييم.
- (٣٧) إستراتيجية للتعامل مع الزواج المبكر من الإستراتيجيات الداعمة للسكان والتنمية.
- (٣٨) تركز الرؤية الخاصة بإستراتيجية الطفل على ضمان تحسين جودة الحياة للأطفال والأمهات ورفاهيتهم وتقديم الدعم والحماية المجتمعية.
- (٣٩) زيادة الاحتياجات من الوحدات السكنية من خصائص المشكلة السكانية في مصر.
- (٤٠) من الآثار المترتبة على مشكلة الزيادة السكانية الضغط الشديد على المرافق.
- (٤١) انخفاض معدل الوفيات من أسباب مشكلة الزيادة السكانية في مصر.
- (٤٢) تعتبر عمالة الأطفال من خصائص المشكلة السكانية في مصر.
- (٤٣) النمو الصناعي من عوامل نمو الدراسات السكانية.
- (٤٤) العدالة من ركائز التنمية الاجتماعية.
- (٤٥) نمو السكان هو اختلاف حجم السكان في هذا المجتمع عبر الفترات الزمنية المتتالية.
- (٤٦) المعنى الضيق للديموغرافيا يقتصر على دراسة حجم وتركيب السكان، والتغيرات التي تطرأ على السكان وتطلق عليها الديموغرافيا الشكلية.
- (٤٧) الديموغرافيا الوصفية تبحث في وصف السكان من حيث العدد والتوزيع والخصائص المميزة لهم.
- (٤٨) يعرف علم السكان بأنه الدراسة العلمية للمجتمعات البشرية من حيث حجمها وتركيبها وتطورها.
- (٤٩) كلمة السكان Population فهي كلمة انجليزية الأصل.
- (٥٠) يعرف pressat علم السكان بأنه "دراسة السكان في كل الحالات الاستقرار والحركة (الديناميكية).

{درجة لكل مفردة}

❖ ثانياً: اختر الإجابة الصحيحة فيما يلي:

- (٥١) صدر الإعلان العالمي لحقوق الإنسان عام ١٩٤٨ متضمناً التأكيد على الحقوق
- (A) المدنية والسياسية فقط. (B) الاقتصادية والاجتماعية فقط. (C) الثقافية فقط. (D) كل ما سبق.
- (٥٢) يعتبر الحق في اعتناق آراء وأفكار خاصة والتعبير عنها أحد الحقوق
- (A) المدنية والسياسية. (B) الحقوق الاقتصادية والاجتماعية. (C) الحقوق البيئية والثقافية والتنموية. (D) لا شيء مما سبق.
- (٥٣) يعتبر..... مصدراً لحقوق الإنسان من الناحية القانونية.
- (A) الاتفاقيات الدولية. (B) العرف الدولي. (C) أحكام المحاكم. (D) A و B.
- (٥٤) في أية طائفة من حقوق الإنسان يُصنف الحق في العمل
- (A) المدنية والسياسية. (B) الحقوق الاقتصادية والاجتماعية. (C) الحقوق البيئية والتنموية. (D) لا شيء مما سبق.
- (٥٥) صدر العهد الدولي للحقوق المدنية والسياسية عام ١٩٧٦ عن
- (A) الجمعية العامة للأمم المتحدة. (B) مجلس الأمن. (C) المجلس الاقتصادي والاجتماعي. (D) محكمة العدل الدولية.



(٢٠ درجة)

السؤال الاول: في ورقة البابل ظلل (T) للعبارة الصحيحة او ظلل (F) للعبارة الخاطئة للعبارة التالية:

١. من مبادئ واخلاقيات مهنة التعليم الثقة والاحترام المتبادل	١١. من مبررات إفشاء الأسرار المختبرية الحماية والدفاع عن شرف مهنته
٢. اللوائح من مصادر الاخلاقيات	١٢. Code of Ethics تعني اخلاقيات المهنة والسلامة المهنية
٣. الانشطة الطلابية تكسب الطلاب العديد من الاخلاقيات	١٣. التدريب هو نشاط منظم يصمم من أجل تحسين الأداء الوظيفي
٤. مصدر الشائعات يكون دائما مصدر موثوق يدل على صحة الخبر	١٤. يعد سقطة علمية استخدام فكرة من موقع على الانترنت ولا تنشر اليه
٥. في معمل تحاليل الانسجة الطبية يمكن التخلص من بقايا الانسجة في سلة المهملات العامة	١٥. من شروط البحث العلمي ان يقدم شيئا جديدا
٦. طفايات الماء تستخدم لاطفاء حرائق الخشب والورق والقماش	١٦. معرفة علامات السلامة المهنية من المهارات المهنية المكتسبة للمقرر
٧. التخلص من مخلفات المعامل يكون بالحرق الآمن والدفن للمخلفات	١٧. اللون الازرق في العلامات الارشادية يعني الزامي
٨. التقرير هو عرض كتابي او شفوي منهجي مركز لموضوع معين يقدمه فرد او مجموعه	١٨. تعرف الكوارث بأنها حوادث غير متوقعة ناجمة عن قوى الطبيعة او بسبب فعل الانسان
٩. يؤدي النهوض بالملكية الفكرية الى دفع عجلة التنمية الاقتصادية واثاحة فرص عمل وصناعات جديدة	١٩. ضرورة استخدام معدات الوقاية والسلامة الشخصية بعد العمل وعدم الاستهانة بأهميتها
١٠. السلامة من أهم اخلاقيات البحث العلمي	٢٠. المفاجأة والاضطراب والارتباك من سمات الطوارئ والازمات

٢٠. ممنوع اللمس	٢٩. حذر حفرة	٢٨. ممنوع السباحة	٢٧. قف	٢٦. حذر بركان	٢٥. مادة مهيجة	٢٤. شباك	٢٣. حريق	٢٢. مخاطر آلة حادة	٢١. ممنوع التدخين

(٢٠ درجات)

السؤال الثاني: في ورقة البابل ظلل حرف A او B او C او D للإجابة الصحيحة:

٣١. مجموعة من الوظائف المتشابهة التي يمكن أن يقوم بها فرد واحد عند اللزوم (A- المهنة - B- العمل - C- الوظيفة - D- كل ما سبق)
٣٢. ان ينسب الباحث احد الأعمال الخاصة بشخص اخر لنفسه دون الإشارة المناسبة للمصدر (A- الاقتباس - B- السرقة العلمية - C- الاستنساخ - D- ما سبق)
٣٣. الرعاف هو (A- نزيف دموي من الانف - B- رعشة الجسم - C- صدمة عصبية - D- كل ما سبق)
٣٤. من مجالات الاخلاقيات البيولوجية (A- الاستنساخ - B- القرصنة البيولوجية - C- سرقة الجينات - D- كل ما سبق)
٣٥. من انواع الشائعات (A- الشائعة البطيئة - B- الشائعة السريعة - C- الشائعة الاستطلاعية - D- كل ما سبق)
٣٦. من صفات الشخصية السوية (A- الثقة - B- الانسجام - C- الواقعية - D- كل ما سبق)
٣٧. من اخلاقيات البحث العلمي (A- الصدق في جمع البيانات - B- العمل الإيجابي - C- تجنب الضرر - D- كل ما سبق)
٣٨. التبليغ فورا في حالة اكتشاف تحاليل ايجابية لمرض (A- الجرب - B- شلل الأطفال - C- الكوليرا - D- كل ما سبق)
٣٩. وجود ميثاق أخلاقي للمهنة هام كـ (A- مرجع يسترشد به - B- حل للخلافات والجدل - C- كلاهما - D- غير ذلك)
٤٠. نحن يهد ميثاق اخلاقيات المهنة ؟ (A- رئيس المؤسسة - B- فريق عمل من المؤسسة - C- لجنة - D- كل ما سبق)
٤١. من الآداب العامة لمزاولة مهنة المختبرات الطبية (A- التواصل - B- الأمل - C- حسن الخلق - D- كل ما سبق)
٤٢. من الخطوات الرئيسية عند تنفيذ عملية مواجهة الكوارث (A- الانذار والتحذير - B- الإخلاء - C- الإيواء - D- كل ما سبق)
٤٣. من الأساليب التي يمكن اللجوء إليها في إدارة الأزمة (A- المناورة والالتفاف - B- الضغوط الاقتصادية - C- الدبلوماسية - D- كل ما سبق)
٤٤. من طرق علاج الشائعات (A- المنطقية في التعامل - B- نشر الحقائق - C- التوعية - D- كل ما سبق)
٤٥. من الأهداف العامة التي تسعى السلامة والصحة المهنية لتحقيقها (A- حماية البشر - B- توفير معدات السلامة - C- حماية الممتلكات - D- كل ما سبق)
٤٦. يجب ان تحتوي شئمة الاسعافات الأولية على (A- مليونات - B- منغصات - C- قطن طبي وشاش - D- كل ما سبق)
٤٧. من الاشتراطات عند تجهيز مختبرات العلوم (A- ملائمة المساحة مع العدد - B- توافر بايين - C- تهوية جيدة - D- كل ما سبق)
٤٨.هو التركيز القاتل لنصف عدد حيوانات التجارب (A- MSDS - B- LC50 - C- LEL - D- LD50)
٤٩. من نفايات المعامل (A- اطباق مزارع بكتيرية - B- نفايات كيميائية - C- بقايا احياء بريه - D- كل ما سبق)
٥٠. من عوامل نجاح ادارة الازمة (A- اتخاذ القرار المناسب في الوقت المناسب - B- ضبط النفس - C- التدريب - D- كل ما سبق)