

U.G./P.G. ENTRANCE EXAMINATION, APRIL 2021

MASTER OF COMPUTER APPLICATION

Time : Two Hours

Maximum : 200 Marks

1. If $y = \sin x + \cos x - 5a$, then $\frac{dy}{dx}$ is :
- (a) $\cos x - \sin x$. (b) $\cos x + \sin x - 5$.
(c) $\sin x - \sec x$. (d) $\sin x + \cos x + 5$.
2. Suppose you want to arrange your Geography, History, English, Hindi, Mathematics and Science books on a shelf. In how many ways can you do it ?
- (a) 360. (b) 780.
(c) 720. (d) 240.
3. If one root of the equation $x^2 + px + 12 = 0$ is 4, while the equation $x^2 + px + q = 0$ has equal roots, then the value of 'q' is :
- (a) $\frac{49}{4}$. (b) 4.
(c) 3. (d) 12.
4. Let two numbers have arithmetic mean 9 and geometric mean 4. Then these numbers are the roots of the quadratic equation :
- (a) $x^2 + 18x + 16 = 0$. (b) $x^2 - 18x - 16 = 0$.
(c) $x^2 + 18x - 16 = 0$. (d) $x^2 - 18x + 16 = 0$.
5. If $\sin 2A = \cos A$, then A is :
- (a) 0. (b) 30.
(c) 60. (d) 45.

Turn over

6. If ABC is a right angle triangle, right angle is at angle A, then what is the value of $\cos (B + C)$
- (a) 0. (b) 1.
(c) 2. (d) - 1.
7. Present age of Sam and Aravind are in the ratio 5 : 4 respectively. Three years hence, their ratio will become 11 : 9 respectively. What is Aravind's present age ?
- (a) 6. (b) 24.
(c) 21. (d) 33.
8. Derivative of $y = \cos (\sin x)$ is :
- (a) $\cos x \cdot \sin x$. (b) $-\cos x \cdot \sin (\sin x)$.
(c) $\sin x \cdot \cos (\cos x)$. (d) $\cos x \cdot \sin (\sin x)$.
9. The slope of the tangent to the curve $y = \frac{x-1}{x-2}$ at $x = 10$ is :
- (a) $\frac{-1}{64}$. (b) 64.
(c) $\frac{1}{64}$. (d) 1.
10. If $X + Y = 10$ and $XY = 24$, then $X^3 + Y^3$ is :
- (a) 280. (b) 100.
(c) 300. (d) 380.
11. The value of 99×101 is :
- (a) 99. (b) 999.
(c) 9999. (d) 1.
12. Find the equation of the plane which is at a distance of $3\sqrt{3}$ units from the origin and the normal to which is equally inclined to the co-ordinate axes.
- (a) $x + y + z = 9$. (b) $3x + 3y + 3z = 9$.
(c) $x - y - z = 3$. (d) $x + y + z = 3$.

13. The function $f : \mathbb{Z} \rightarrow \mathbb{Z}$ given by $f(x) = x^2$ is :
- One-one and onto.
 - One-one but not onto.
 - Onto but not one-one.
 - Not one-one and not onto.
14. A is two years older than B ,who is twice as old as C. The total ages of A, B, C be 27. How old is B ?
- 5.
 - 10.
 - 12.
 - 2.
15. Find points at which the tangent to the curve $y = x^3 - 3x^2 - 9x + 7$ is parallel to the x -axis :
- (3, 20) and (1, - 12).
 - (- 3, - 20) and (-1, 12).
 - (3, - 20) and (- 1, 12).
 - (1, 20) and (1, 12).
16. $\int \frac{\sec^2 x}{\operatorname{Cosec}^2 x} dx$ is :
- $\tan x + x + C$.
 - $\tan x + \cot x + C$.
 - $\tan x - x + C$.
 - $\cot x + C$.
17. Write the unit vector perpendicular to both the vectors $\hat{a} = \hat{i} + \hat{j} + \hat{k}$ and $\hat{b} = \hat{i} + \hat{j}$.
- ± 1 .
 - 1.
 - ± 2 .
 - 2.
18. Find the angle between the lines $2x = 3y = -z$ and $6x = -y = -4z$.
- π .
 - 0.
 - $\frac{\pi}{2}$.
 - $\frac{\pi}{4}$.
19. If $f(x) = \sin x$ and $g(x) = 3x^2$, then $f \circ g(x)$ is :
- $3 \sin x$.
 - $3 \sin^2 x$.
 - $\sin 3x$.
 - $\sin 3x^2$.

Turn over

20. A clock strikes once at 1 O'clock twice at 2 O'clock and thrice at 3 O'clock, what is the total number strikes in 24 hours :
- (a) 300. (b) 156.
(c) 78. (d) 196.
21. The set \mathbb{R} of real numbers is :
- (a) Closed. (b) Bounded.
(c) Countable. (d) Open.
22. The sequence $\left\{\frac{1}{n}\right\}$ is :
- (a) Convergent. (b) Divergent.
(c) Oscillatory. (d) Unbounded.
23. The sum of integers from 1 to 100 which are divisible by 2 or 5 is :
- (a) 3,000. (b) 3,010.
(c) 3,150. (d) 3,050.
24. The value that occurs in the given data most frequently is called the :
- (a) Frequently. (b) Mean.
(c) Mode. (d) Median.
25. If $A = \begin{pmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{pmatrix}$, then $A^n =$
- (a) $A = \begin{pmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{pmatrix}$. (b) $A = \begin{pmatrix} \cos n\theta & \sin n\theta \\ -\sin n\theta & \cos n\theta \end{pmatrix}$.
(c) $A = \begin{pmatrix} \cos \theta^n & \sin \theta^n \\ -\sin \theta^n & \cos \theta^n \end{pmatrix}$. (d) $A = \begin{pmatrix} \cos^n \theta & \sin^n \theta \\ -\sin^n \theta & \cos^n \theta \end{pmatrix}$.
26. By what number 2.071 be multiplied to get the product 207.1 ?
- (a) 2. (b) 10.
(c) 20. (d) 100.

27. 8 litres of milk contains 20 % of water, what amount of water should be added so that amount of water will be 25 % ?
- (a) 0.4 litre. (b) 1.6 litre.
(c) 2.5 litre. (d) 2 litre.
28. The difference between simple interest and compound interest on Rs. 76,565 for 1 year at 15 % per annum :
- (a) 300. (b) 375.
(c) 40. (d) 0.
29. A square matrix A is said to be singular matrix if :
- (a) $|A| = 0$. (b) $|A| \neq 0$.
(c) $|A| = 1$. (d) $|A| = -1$.
30. If $A : B = 2 : 3$, $B : C = 4 : 5$ and $C : D = 6 : 7$. Find $A : B : C : D$:
- (a) 16 : 24 : 30 : 35. (b) 2 : 5 : 6 : 7.
(c) 4 : 6 : 8 : 4. (d) 1 : 1 : 1 : 1.
31. Given an experiment such that $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ $P(A \cap B) = \frac{1}{4}$. Then the value of $P(\bar{A} \cap \bar{B})$ is :
- (a) $\frac{10}{12}$. (b) $\frac{7}{12}$.
(c) $\frac{5}{12}$. (d) $\frac{2}{12}$.
32. The odds in favour of A solving a mathematical problem is 3 to 4 and odds against B solving the problem is 5 to 7. Then probability that the problem will be solved by at least one of them is :
- (a) $\frac{16}{21}$. (b) $\frac{7}{12}$.
(c) $\frac{1}{4}$. (d) $\frac{3}{7}$.

Turn over

33. Four coins are tossed simultaneously. What is the probability of getting exactly 2 heads ?

(a) $\frac{1}{8}$.

(b) $\frac{3}{8}$.

(c) $\frac{5}{8}$.

(d) $\frac{7}{8}$.

34. In answering a question on multiple choice test a student either knows the answer or he guesses. Let P be the probability that he knows the answer and $1 - P$ be the probability that he guesses. Assume that a student who guesses the answer will be correct with probability $1/5$ where 5 is the number of multiple choice alternatives. What is the conditional probability that a student knew the answer to a question given that he answered it correctly ?

(a) $\frac{4P}{3P + 1}$.

(b) $\frac{5P}{4P + 1}$.

(c) $\frac{P}{3P + 1}$.

(d) $\frac{P}{4P + 1}$.

35. Let X_1 and X_2 are independently and identically distributed random variables following Binomial $(1, \theta)$. Let $Y_i = 1 - X_i$, then the distribution of $Y_1 + Y_2$ is :

(a) Binomial $(2, \theta)$.

(b) Binomial $(1, \theta)$.

(c) Binomial $(2, 1 - \theta)$.

(d) Binomial $(1, 1 - \theta)$.

36. A random variable X has the following probability distribution :

x	1	2	3	4	5	6	7
$P(x)$:	k	$2k$	$2k$	$3k$	K^2	$2k^2$	$7k^2 + k$.

The value of k is :

(a) 10.

(b) $\frac{1}{10}$.

(c) -1.

(d) $\frac{1}{7}$.

37. If a random variable X assumes only positive integral values with the probability

$$P[X = x] = \frac{2}{3} \left(\frac{1}{3}\right)^{x-1}, \quad x = 1, 2, 3, \dots \text{ then } E(X) \text{ is:}$$

- (a) $2/9$. (b) $2/3$.
(c) 1 . (d) $3/2$.

38. If X is a normally distributed random variables with mean 0 and variance 1, then the variance of X^2 is :

- (a) 0. (b) 1.
(c) 2. (d) 4.

39. The range of the correlation co-efficient is :

- (a) $(-1, 1)$. (b) $(0, 1)$.
(c) $(0, \infty)$. (d) $(-\infty, \infty)$.

40. Arithmetic mean of first n natural numbers is :

- (a) $\frac{n+1}{2}$. (b) $\frac{n(n+1)}{2}$.
(c) $\frac{n-1}{2}$. (d) $\frac{n(n-1)}{2}$.

41. The vectors \vec{A} and \vec{B} are such that $|\vec{A} + \vec{B}| = |\vec{A} - \vec{B}|$. Then the angle between the two vectors is _____.

- (a) 75° . (b) 45° .
(c) 90° . (d) 60° .

42. Which of the following is a one-dimensional motion ?

- (a) Landing of an aircraft.
(b) Earth revolving around the sun.
(c) Motion of wheels of moving train.
(d) Train running on a straight track.

43. The ratio of the numerical values of the average velocity and average speed of a body is always _____.

- (a) Unity. (b) Unity or less.
(c) Unity or more. (d) Less than unity.

Turn over

44. A charged particle moving in a magnetic field experiences a resultant force is _____.

- (a) In the direction of field.
- (b) In the direction opposite to the field.
- (c) In the direction perpendicular to both the field and its velocity.
- (d) None of the above.

45. The direction of magnetic lines of forces close to a straight conductor carrying current will be _____.

- (a) Along the length of the conductor.
- (b) Radially outward.
- (c) Circular in a plane perpendicular to the conductor.
- (d) Helical.

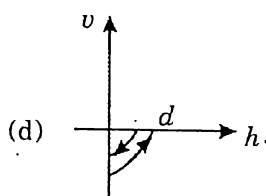
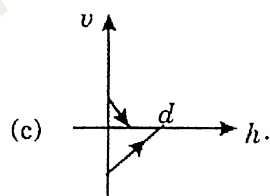
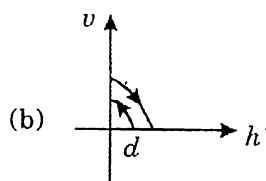
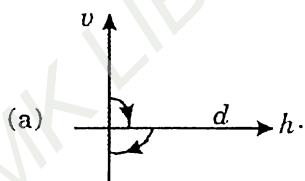
46. A charged particle of mass m and charge q travels in a circular path of radius r that is perpendicular to a magnetic field B . The time taken by the particle to complete one revolution is _____.

- (a) $\frac{2\pi qB}{m}$.
- (b) $\frac{2\pi m}{qB}$.
- (c) $\frac{2\pi m q}{B}$.
- (d) $\frac{2\pi q^2 B}{m}$.

47. Time taken by an object falling from rest to cover the height of h_1 and h_2 is respectively t_1 and t_2 then the ratio of t_1 to t_2 is _____.

- (a) $h_1 : h_2$.
- (b) $\sqrt{h_1} : \sqrt{h_2}$.
- (c) $h_1 : 2h_2$.
- (d) $2h_1 : h_2$.

48. A ball is dropped vertically from a height d above the ground. It hits the ground and bounces up vertically to a height $d/2$. Neglecting subsequent motion and air resistance, its velocity v varies with the height h above the ground as _____.



49. If a current is passed in spring, it gets ———.
- (a) Compressed. (b) Expanded.
(c) Oscillates. (d) Unchanged.
50. Lorentz force can be calculated by using formula :
- (a) $\vec{F} = q(\vec{E} + \vec{v} \times \vec{B})$. (b) $\vec{F} = q(\vec{E} + \vec{v} \cdot \vec{B})$.
(c) $\vec{F} = q(\vec{E} + \vec{v} \cdot \vec{B})$. (d) $\vec{F} = q(\vec{E} + \vec{B} + \vec{v})$.
51. In orbitals of equivalent energy, electron spin remains unpaired to the maximum extent possible'. This statement is referred to as ———.
- (a) Hund's rule.
(b) Pauli's Exclusion Principle.
(c) Aufbau Principle.
(d) Uncertainty Principle.
52. Mohr's salt is ———.
- (a) $\text{NH}_4\text{Fe}(\text{SO}_4)_2 \cdot 5\text{H}_2\text{O}$.
(b) $(\text{NH}_4)_2\text{Fe}(\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$.
(c) $(\text{NH}_4)_2\text{Fe}(\text{SO}_4)_2 \cdot 24\text{H}_2\text{O}$.
(d) $\text{NH}_4\text{Fe}(\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$.
53. In H_2O , the oxygen orbitals are ——— hybridized.
- (a) sp^2 . (b) sp .
(c) sp^3 . (d) dsp^2 .
54. The IUPAC name of $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{C}(\text{CH}_3)_2 - \text{OH}$ is ———.
- (a) 1, 1-dimethyl-1-butanol.
(b) 2-hydroxy-2-methyl pentane.
(c) Dimethyl butyl alcohol.
(d) 2-methyl - 2-pentanol.

Turn over

55. In benzene, all C-c bonds have the same bond length. This is because of _____.
- (a) Tautomerism. (b) Metamerism.
(c) Isomerism. (d) Resonance.
56. During the isothermal expansion of an ideal gas, its _____.
- (a) Internal energy increases.
(b) Enthalpy decreases.
(c) Enthalpy remains unaffected.
(d) Internal energy decreases.
57. The chemical reaction taking place at the anode is known as _____.
- (a) Reduction. (b) Oxidation.
(c) Ionization. (d) Hydrolysis.
58. Permanent hardness of water is due to the presence of _____.
- (a) Magnesium sulphate.
(b) Calcium bicarbonate.
(c) Calcium sulphate.
(d) Magnesium bicarbonate.
59. Natural rubber is a polymer of _____.
- (a) Isoprene. (b) Isopentane.
(c) Propene. (d) Isobutene.
60. Soaps are sodium or potassium salts of _____.
- (a) Glycerol. (b) Fatty acids.
(c) Phenol. (d) Alcohols.
61. Which normal form converts the composite attribute into atomic attribute :
- (a) 1NF. (b) 2NF.
(c) BCNF. (d) PJNF.

62. Which of the following data type is used to store Movies and image files in SQL ?
- (a) Multimedia. (b) Blob.
(c) Binary. (d) Image.
63. Features of windows operating system includes :
- (a) Multitasking.
(b) Switching between operations.
(c) Running several programs in parallel.
(d) All of the above.
64. Windows is a _____.
- (a) Application software.
(b) System software.
(c) Utility software.
(d) General Purpose software.
65. What is the major drawback of RAD Model in software engineering ?
- (a) It requires highly skilled developers/designers.
(b) It cannot gather customer feedback.
(c) It may over-promise the system features.
(d) None of the above.
66. What does "Timeboxed" means in Agile terms ?
- (a) Fast. (b) Flexible.
(c) Frequent. (d) Fixed.
67. Parsing also known as _____.
- (a) Syntax analysis. (b) Sematic Analysis.
(c) Lexical analysis. (d) None of the above.
68. Assembler is used as a translator for _____.
- (a) Machine Language. (b) High Level Language.
(c) Low level Language. (d) Intermediate Language.

Turn over

69. Power set of a null set have exactly _____ number of subsets.
- (a) Zero. (b) Two.
(c) One. (d) None of the above.
70. The contrapositive of $p \rightarrow q$ is the proposition of _____.
- (a) $\neg p \rightarrow \neg q$. (b) $\neg q \rightarrow \neg p$.
(c) $q \rightarrow p$. (d) $\neg q \rightarrow p$.
71. Which of the following Law of Boolean algebra proves that $X.X = X$?
- (a) Identity Law.
(b) Double Complement Law.
(c) Complement Law.
(d) Idempotent Law.
72. The following hexadecimal number $(1E.43)_{16}$ is equivalent to _____.
- (a) $(36.506)_8$. (b) $(35.506)_8$.
(c) $(36.206)_8$. (d) $(35.206)_8$.
73. The interrupt-request line is a part of the _____.
- (a) Data line.
(b) Control line.
(c) Address line.
(d) None of the above.
74. The bit used to signify that the cache location is updated is _____.
- (a) Dirty bit. (b) Update bit.
(c) Reference bit. (d) Flag bit.
75. Which of the following statement is false for the Binary Search Tree ?
- (a) The left child value is always less than its parent.
(b) The right child value is always greater than its parent.
(c) In order traversing in Binary Search Tree gives decreasing order of elements in the nodes.
(d) Both Left and right subtree also should be in Binary Search Tree.

76. _____ is the average case of performance of binary search algorithm.

- (a) $O(\log n)$. (b) $O(n \log n)$.
(c) $O(n)$. (d) $O(l)$.

77. A memory variable that holds the address of another variable in C programming language is known as _____.

- (a) Integer. (b) Struct.
(c) Files. (d) None of the above.

78. What will be the output of the following C program code ?

```
#include <stdio.h>

void main()
{
    int x = 0 ;
    if (x == 0)
        printf("hi");
    else
        printf("how are u");
    printf("hello");
}
```

- (a) hi. (b) how are u.
(c) hihello. (d) hello.

79. Which of the following logic gate is an example of universal gate ?

- (a) AND. (b) OR.
(c) EX-OR. (d) NAND.

80. How is a J-K flip-flop made to toggle ?

- (a) $J = 0, K = 0$. (b) $J = 0, K = 1$.
(c) $J = 1, K = 0$. (d) $J = 1, K = 1$.

81. Which of the following is not a type of Constructor ?

- (a) Friend constructor. (b) Copy constructor.
(c) Default constructor. (d) Parameterized constructor.

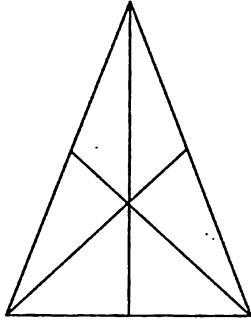
Turn over

82. Which of the following is correct ?
- (a) A class is an instance of its objects.
 - (b) An object is an instance of its class.
 - (c) A class is an instance of the data type that the class have.
 - (d) An object is an instance of the data type of the class.
83. A collection of hyperlinked documents on the internet forms the _____.
- (a) WWW.
 - (b) E-mail.
 - (c) HTML.
 - (d) FTP.
84. Which of the following communication modes support two-way traffic but in only one direction at a time ?
- (a) Simplex.
 - (b) Half-duplex.
 - (c) Full duplex.
 - (d) None of the above.
85. Which of the following operator is used to allocate memory for an object in Java ?
- (a) Malloc.
 - (b) Calco.
 - (c) New.
 - (d) Give.
86. JVM stands for _____.
- (a) Java Volatile Machine.
 - (b) Java Virtual Machine.
 - (c) Java Vision Machine.
 - (d) Java Virtual Method.
87. Which of the following SQL command is used for retrieving data from a relation?
- (a) DELETE.
 - (b) INSERT.
 - (c) SELECT.
 - (d) JOIN.
88. Which system call creates the new process in Unix/Linux operating system ?
- (a) fork().
 - (b) pipe()
 - (c) new()
 - (d) init()
89. Which one of the following is the deadlock avoidance algorithm ?
- (a) Round-robin algorithm.
 - (b) Elevator algorithm.
 - (c) Karn's algorithm.
 - (d) Banker's algorithm.

90. The length of an IPv4 address is ?

- (a) 32 bits. (b) 64 bits.
(c) 128 bits. (d) 256 bits.

91. Find the number of triangles in the given figure.



- (a) 7. (b) 9.
(c) 13. (d) 16.

92. A dice is numbered from 1 to 6 in different ways. If 1 is adjacent to 2, 4 and 6, then which of the following statements is necessarily true ?

- (a) 2 is opposite to 6. (b) 1 is adjacent to 3.
(c) 3 is adjacent to 5. (d) 3 is opposite to 5.

93. Find the next number in the series 120, 99, 80, 63, 48, _____.

- (a) 35. (b) 38.
(c) 39. (d) 40.

94. A person crosses a 600 m. long street in 5 minutes. What is his speed in km per hour ?

- (a) 3.6. (b) 7.2.
(c) 8.4. (d) 9.2.

95. A transporter receives the same number of orders each day. Currently, he has some pending orders (backlog) to be shipped. If he uses 7 trucks, then at the end of the 4th day he can clear all the orders. Alternatively, if he uses only 3 trucks, then all the orders are cleared at the end of the 10th day. What is the minimum number of trucks required so that there will be no pending order at the end of the 5th day ?

- (a) 4. (b) 5.
(c) 6. (d) 7.

Turn over

96. Pointing to a lady, Mr. Rahul said, "Her mother's brother is the only son of my mother's father." Then how is the lady's mother related to Mr. Rahul ?
- (a) Mother. (b) Sister.
(c) Grandmother. (d) Aunt.
97. In how many different ways can the letters of the word 'LEADING' be arranged in such a way that the vowels always come together ?
- (a) 720. (b) 620.
(c) 520. (d) 550.
98. The cost price of 20 articles is the same as the selling price of x articles. If the profit is 25%, then the value of x is :
- (a) 25. (b) 18.
(c) 16. (d) 15.
99. EGG : OMELETTE = _____.
- (a) Clay : pottery. (b) Dam : river.
(c) Student : classroom. (d) Onion : salad.
100. One day morning after sunrise, Mr. Vivek was standing facing a pole. The shadow of the pole fell exactly to his right. To which direction was he facing ?
- (a) East. (b) West.
(c) North. (d) South.