



2022
INTEGRATED MCA
Computer Science and Applications
UTKAL UNIVERSITY

Total Number of Questions = 70

Full Marks: 70
Time: 01 Hour 30 Minutes

Name of
Candidate:

Roll no:

Instruction to the Candidates:

1. Do not open the booklet until the announcement is made.
2. Do not leave the examination hall until the examination is over.
3. All questions are compulsory and are of multiple choice types.
4. Each question shall have four answers (including one correct answer) and the examinee shall have to darken only the appropriate circle/oval using black / blue ball point pen.
5. **There is no negative mark for wrong answer.**
6. Each correct answer shall fetch **one mark**; each un-attempted question will fetch **zero mark**.
7. If more than one circle is darkened for one question, it will be treated as an incorrect answer.
8. Left side blank pages of question booklet can be used for rough work.
9. Infringement of examination rule of any type will lead to cancellation of evaluation of answer script.
10. Use of Electronic Gadgets including Smart watch or Cell phone is strictly prohibited.
11. Do not ask for clarification from the invigilator(s) regarding the question. In case any correction/clarification is deemed necessary, the invigilator(s) will announce it publicly.

15. Probability is expressed as: _____.
- A. Ratio B. Proportion C. Percentage D. All of these
16. If A and B are two events, the probability of occurrence of both A and B simultaneously is given as: _____.
- A. $P(A) + P(B)$ B. $P(A \cup B)$ C. $P(A \cap B)$ D. $P(A)P(B)$
17. Given that $P(A) = \frac{1}{3}$, $P(B) = \frac{3}{4}$ and $P(A \cup B) = \frac{11}{12}$, the probability $P(B/A)$ is:
- A. $1/6$ B. $4/9$ C. $1/2$ D. None of these
18. Two dice were tossed by two players A and B . A throws 10, the probability that B throws more than A is:
- A. $1/12$ B. $1/6$ C. $1/18$ D. None of these
19. The probability of selecting a male or female is same. In an office of n persons, if the probability that $(n - 1)$ males being selected is $\frac{3}{2^{10}}$, the value of n is:
- A. 5 B. 3 C. 10 D. 12
20. If $AB = A$ and $BA = B$, where A and B are square matrices, then
- A. $B^2 = B$ and $A^2 = A$ B. $B^2 \neq B$ and $A^2 = A$
C. $B^2 = B$ and $A^2 \neq A$ D. $B^2 \neq B$ and $A^2 \neq A$
21. If $A = \begin{bmatrix} 1 & a \\ 0 & 1 \end{bmatrix}$, then A^n (where $n \in \mathbb{N}$) equals to:
- A. $\begin{bmatrix} 1 & na \\ 0 & 1 \end{bmatrix}$ B. $\begin{bmatrix} 1 & n^2a \\ 0 & 1 \end{bmatrix}$ C. $\begin{bmatrix} 1 & na \\ 0 & 0 \end{bmatrix}$ D. $\begin{bmatrix} n & na \\ 0 & n \end{bmatrix}$
22. If A is a square matrix such that $A^2 = A$, then $(I + A)^3 - 7A$ is equal to:
- A. A B. $I - A$ C. I D. $3A$
23. If $A = \begin{bmatrix} 5 & x \\ y & 0 \end{bmatrix}$ and $A = A^T$, then
- A. $x = 0, y = 5$ B. $x + y = 5$ C. $x = y$ D. none of these
24. Which of given values of x and y make the following pairs of matrices equal?
- $\begin{bmatrix} 3x + 7 & 5 \\ y + 1 & 2 - 3x \end{bmatrix}$ and $\begin{bmatrix} 0 & y - 2 \\ 8 & 4 \end{bmatrix}$
- A. $x = -\frac{1}{3}, y = 7$ B. $x = -\frac{2}{3}, y = 7$
C. $x = -\frac{1}{3}, y = -\frac{2}{5}$ D. not possible to find
25. If $A = [a_{ij}]$ is a square matrix of even order such that $a_{ij} = i^2 - j^2$, then
- A. A is a skew symmetric matrix and $|A| = 0$
B. A is a symmetric matrix and $|A| = 0$
C. A is a symmetric matrix
D. None of these
26. If A and B are square matrices such that $B = A^{-1}BA$, then $(A + B)^2$ is equal to:
- A. O B. $A^2 + B^2$ C. $A^2 + 2AB + B^2$ D. $A + B$

37. Which of the following is an expansion of e^{2x} ?

- A. $1 + 2x + 2x^2 + 2x^3 + 2x^4 + \dots$
- B. $1 + 2x + 4x^2 + 8x^3 + 16x^4 + \dots$
- C. $1 + 2x + 2x^2 + \frac{4}{3}x^3 + \frac{2}{3}x^4 + \dots$
- D. $1 + \frac{x}{2} + \frac{x^2}{4} + \frac{x^3}{8} + \frac{x^4}{16} + \dots$

38. Determine the value of K for which the following function is continuous at $X=3$

$$f(X) = \begin{cases} \frac{X^2 - 9}{X - 3}, & X \neq 3 \\ K, & X = 3 \end{cases}$$

- A. $K=6$
- B. $K=3$
- C. $K=5$
- D. $K=9$

39. If $x = r \cos \theta$, $y = r \sin \theta$, then $\frac{\partial(x, y)}{\partial(r, \theta)}$ is equal to

- A. -1
- B. r
- C. $1/r$
- D. 1

40. The point on the curve $y = 12x - x^2$ where the tangent is parallel to x-axis is

- A. (0, 0)
- B. (2, 16)
- C. (3, 9)
- D. (6, 36)

41. $\lim_{n \rightarrow \infty} \frac{1^2 + 2^2 + \dots + n^2}{n^3} =$

- A. $1/6$
- B. $1/3$
- C. $1/2$
- D. None of these

42. $\lim_{x \rightarrow \infty} \left(1 + \frac{2}{x}\right)^x$ equals

- A. e
- B. ∞
- C. e^2
- D. $1/e$

43. The integrating factor of the differential equation $\frac{dy}{dx}(x \log x) + y = 2 \log x$, is given by

- A. ex
- B. $\log x$
- C. $\log(\log x)$
- D. x

44. $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 2y = 0$ has the solution

- A. $y = c_1 e^{-2x} + c_2 e^{-x}$
- B. $y = ce^{-2x}$
- C. $y = c_1 e^{-2x} + c_2 e^{-x} + c_3$
- D. None of these

45. The direction cosines of the line joining the points (1,2,-3) and (-2,3,1) are:

- A. (-3,1,4)
- B. (-1,5,-2)
- C. $\left(\frac{-3}{\sqrt{26}}, \frac{1}{\sqrt{26}}, \frac{4}{\sqrt{26}}\right)$
- D. $\left(\frac{-1}{\sqrt{30}}, \frac{5}{\sqrt{30}}, \frac{-2}{\sqrt{30}}\right)$

46. The equation of Z-axis is

- A. $x = 0, z = 0$
- B. $y = 0, z = 0$
- C. $x = 0, y = 0$
- D. $x = k, y = -k, k \neq 0$

47. If $\vec{a}, \vec{b}, \vec{c}$ are three vectors such that $|\vec{a}| = 2$, $|\vec{b}| = 3$, $|\vec{c}| = 4$ and $\vec{a} + \vec{b} + \vec{c} = 0$ then the value of $\vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a} + \vec{a} \cdot \vec{b}$ is equal to

- A. $19/2$
- B. $-19/2$
- C. $29/2$
- D. $-29/2$

48. If X and Y are two sets, $X \cap (Y \cup X)^c$ equals
 A. X B. Y C. \emptyset D. None of these
49. Suppose A_1, A_2, \dots, A_{30} are thirty sets each having 5 elements and B_1, B_2, \dots, B_n are n sets each with three elements such that $S = \bigcup_{i=1}^{30} A_i = \bigcup_{j=1}^n B_j$ and each element of S belongs to exactly 10 of A_i 's and exactly 9 of B_j 's, the $n =$
 A. 15 B. 3 C. 45 D. None of these
50. Let $f: R \rightarrow R$ be a function defined by $f(x) = \frac{e^{|x|} - e^{-x}}{e^x + e^{-x}}$, then
 A. f is both one-one and onto B. f is one-one but not onto
 C. f is not one-one but onto D. f is neither one-one nor onto
51. The difference between the largest number and the smallest number formed from the 5 digits 0, 1, 2, 3, 4 using each digit exactly once is ____.
 A. 41769 B. 41967 C. 41976 D. None of these
52. There are 12 towns grouped into four zones with three towns per zone. It is intended to connect the towns with telephone lines such that every two towns are connected with three direct lines if they belong to the same zone and with only one direct line otherwise. How many direct telephone lines are connected?
 A. 60 B. 75 C. 80 D. 90
53. From a point P on a level ground, the angle of elevation of the top tower is 30° . If the tower is 100 m high, the distance of point P from the foot of the tower is:
 A. 149 m B. 156 m C. 173 m D. 200 m
54. 3 pumps, working 8 hours a day, can empty a tank in 2 days. How many hours a day must 4 pumps work to empty the tank in 1 day?
 A. 16 B. 12 C. 11 D. 10
55. In one hour, a boat goes 11 km/hr along the stream and 5 km/hr against the stream. The speed of the boat in still water (in km/hr) is _____.
 A. 3 km/hr B. 5 km/hr C. 8 km/hr D. 9 km/hr
56. A man has Rs.480 in the denominations of one-rupee notes, five-rupee notes and ten-rupee notes. The number of notes of each denomination is equal. What is the total number of notes that he has?
 A. 45 B. 60 C. 75 D. 90
57. 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. 360 B. 480 C. 720 D. 5040
58. If one-third of one-fourth of a number is 15, then three-tenth of that number is _____.
 A. 35 B. 36 C. 45 D. 54

59. A bus for Delhi leaves every thirty minutes from a bus stand. An enquiry clerk told a passenger that the bus has already left 10 minutes ago and the next bus will leave at 9.35 am. At what time did the enquiry clerk give this information to the passenger?
A. 9.15 AM
B. 9.10 AM
C. 9.20AM
D. None of the Above
60. The average noon temperature for Monday, Tuesday, and Wednesday was 53° and for Tuesday, Wednesday and Thursday was 56° . If the noon temperature on Thursday was 60° , find the noon temperature on Monday?
A. 52°
B. 51°
C. 54°
D. 53°
61. Junk e-mail is also called _____.
A. Spoof
B. Spam
C. Spool
D. Sniffer
62. WAN stands for _____.
A. Wap Area Network
B. Wide Area Network
C. Wide Array Net
D. Wireless Area Network
63. A computer cannot “boot” if it does not have the _____.
A. Compiler
B. Loader
C. Operating System
D. Assembler
64. The main component of first generation computer was _____.
A. Transistors
B. Vacuum Tubes and Valves
C. Integrated Circuits
D. None of above
65. SMPS stands for _____.
A. Switched Mode Power Supply
B. Start Mode Power Supply
C. Store Mode Power Supply
D. Single Mode Power Supply
66. Which one of the following is NOT a computer language?
A. LINUX
B. BASIC
C. COBOL
D. C++
67. The ability to recover and read deleted or damaged files from a criminal's computer is an example of a law enforcement known as _____.
A. robotics
B. simulation
C. computer forensics
D. animation
68. Which of the following are the functions of an operating system?
A. Allocates resources
B. Monitors activities
C. Manages disks and files
D. All of these
69. A file is of size 10 KBytes. What is the size of the file in bits?
A. 10,000
B. 81,920
C. 10,240
D. 80,240
70. In _____ mode, the communication channel is used in both directions at the same time?
A. Full-duplex
B. Simplex
C. Half-duplex
D. None of these