

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.
- 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 <u>an incorrect answer</u>.
- 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.
- 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.

1.	The arithmetic mean A. 50	of first 100 natural num B. 50.5	mbers is C. 51	D. 55	
2.	To compare the variability of two or more s A. a measure of central value C. a measure of coefficient of dispersion		B. a measure of dispersion D. None of these		
3.	Karl Pearson's coefficient of correlation is i A. both origin and scale C. scale only		nvariant of change of B. origin only D. neither origin nor scale		
4.	If two regression coefficients $b_{yx}$ and $b_{xy}$ are value of the correlation coefficient?		the 5 and $\frac{1}{20}$ , respectively, what is the		
	A. 1	B1	C. 0.50	D0.50	
5.	A coin is tossed three times in succession. The number of sample points in sample space is				
	A. 2	B. 3	C. 6	D. 8	
6.	A non-leap year is se 53 Sundays?	lected at random. Wh	at is the probability the	at the year will have	
	A. 1/7	B. 2/7	C. 3/7	D. 1	
7.	A card is drawn at ra is either a club or an a	ndom from a pack of ace is	cards. The probability	that the card drawn	
	A. 1/4	B. 1/13	C. 4/13	D. 17/52	
8.	If a random variable $X (= 0, 1)$ follows Bernoulli distribution with parameter $\theta$ , then				
	its pmf is A. $\theta^{1+x}(1-\theta)^{1-x}$	B. $\theta^x (1-\theta)^{1+x}$	$C.\theta^x(1-\theta)^{1-x}$	$\mathbf{D}.\theta^{1+x}(1-\theta)^x$	
9.	If the distance betwee A. $\pm 4$	en the points (4, a) and B. 4	<i>l</i> (1, 0) is 5, then the v C4	alue of <i>a</i> is D. 0	
10.	. If the centroid of the triangle formed the points $(7, x)$ , $(y, -6)$ and $(9, 10)$ is at $(6, 3)$ ,				
	then ( <i>x</i> , <i>y</i> ) is A. (4, 5)	 B. (5,4)	C. (-5, -2)	D. (5,2)	
11.	The radius of the circ	le $x^2 + y^2 - 2x + 4y$	+ 1 = 0 is		
	A. 1	B. 2	C. 4	D. √19	
12.	The Latus rectum of t A. 2	he parabola $(y - 2)^2$ B. 4	= 8(x + 3) is C.16	D. None of these	
13.	The plane $y - z + 1 = 0$ is A. parallel to $x - axis$ C. parallel to $xy - plane$		B. perpendicular to $x - axis$ D. perpendicular to $yz - plane$		
14.	. The outcomes of tossing a coin is a: A. simple event C. complementary event		 B. mutually exclusive event D. compound event		

15.	Probability is express A. Ratio	ed as: 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. $P(A \cap B)$	$\mathbf{D}. P(A)P(B)$
17.	Given that $(A) = \frac{1}{3}$ , A. 1/6	$P(B) = \frac{3}{4} and P(A \cup B. 4/9)$	B) = $\frac{11}{12}$ , the probabili C. 1/2	ty $P(B/A)$ is: D. None of these
18.	Two dice were tossed	by two players A and	B. A throws 10, the pr	robability that <i>B</i>
	A. 1/12	B. 1/6	C. 1/18	D. None of these
19.	The probability of sel probability that $(n - n)$	ecting a male or femal 1) males being selecte	e is same. In an office d is $\frac{3}{2^{10}}$ , the value of <i>n</i>	of <i>n</i> persons, if the is:
	A. 5	B. 3	C. 10	D. 12
20.	If $AB = A$ and $BA =$ A. $B^2 = B$ and $A^2 =$ C. $B^2 = B$ and $A^2 \neq$	<i>B</i> , where <i>A</i> and <i>B</i> are <i>A A</i>	square matrices, then B. $B^2 \neq B$ and $A^2 =$ D. $B^2 \neq B$ and $A^2 \neq$	A A
21.	If $A = \begin{bmatrix} 1 & a \\ 0 & 1 \end{bmatrix}$ , then A	$\mathbb{I}^n$ (where $n \in N$ ) equ	als to:	
	A. $\begin{bmatrix} 1 & na \\ 0 & 1 \end{bmatrix}$	B. $\begin{bmatrix} 1 & n^2 a \\ 0 & 1 \end{bmatrix}$	C. $\begin{bmatrix} 1 & na \\ 0 & 0 \end{bmatrix}$	D. $\begin{bmatrix} n & na \\ 0 & n \end{bmatrix}$
22.	If <i>A</i> is a square matrix A. <i>A</i>	A such that $A^2 = A$ , the B. $I - A$	en $(I + A)^3 - 7A$ is equ. C. I	ual to: D. 3 <i>A</i>
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 value $\begin{bmatrix} 3x + 7 & 5\\ y + 1 & 2 - 3x \end{bmatrix}$ A.x = $-\frac{1}{3}$ , y = 7 C. x = $-\frac{1}{2}$ , y = $-\frac{2}{5}$	s of x and y make the and $\begin{bmatrix} 0 & y-2 \\ 8 & 4 \end{bmatrix}$ B. x = D. not	following pairs of matrix = $-\frac{2}{3}$ , $y = 7$ possible to find	rices equal?
25	If $A = [a_{}]$ is a source of $A = [a_{}]$	are matrix of even orde	Per such that $a_{ij} = i^2 - i^2$	$-i^2$ then
23.	A. A is a skew symmetric n C. A is a symmetric n D. None of these	etric matrix of even of the etric matrix and $ A  = 0$ natrix and $ A  = 0$	0	, unen
26.	If A and B are square	matrices such that $B =$	$= A^{-1}BA$ , then $(A + B)$	$(2)^2$ is equal to:

6. 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

27. For any 2 × 2 matrix, if  $A(AdjA) = \begin{bmatrix} 10 & 0 \\ 0 & 10 \end{bmatrix}$ , then |A| is equal to: A. 20 B. 100 C. 10 D. 0 28. The matrix  $\begin{bmatrix} 5 & 10 & 3 \\ -2 & -4 & 6 \\ -1 & -2 & b \end{bmatrix}$  is a singular matrix, if the value of *b* is: A. -3  $A_{-3}$ C. 0 D. Non-existent 29. The number of solutions of the system of equations: 2x + y - z = 7, x - 3y + 2z = 71 and x + 4y - 3z = 5 is C.1 A. 3 **B**. 2 D. 0 30. Evaluate  $\lim_{x \to \infty} \frac{x^2 + 5}{x^2 + 4x + 3}$ A. 1 **B**. 2 C. 4 D. None of these 31. If  $U = x^y$ , then  $\frac{\partial U}{\partial x}$  is B.  $yx^{y-1}$ C.  $x^{y} \log x$ A. 0 D. None of these 32. The curve  $y = x^3 - 3x^2 - 9x + 9$  has a point of inflexion at; A. x=3 B. x=-3 D. x=1 C. x=-1 33. Find the value of  $\lim_{x \to \infty} \frac{x+2}{9x^2+1}$ C. 2/9 B. 1/9 D. co A. 0 34. Given  $y = 5e^{3x} + \sin x$ ,  $\frac{\partial y}{\partial x}$  is A.  $5e^{3x} + \cos x$  B.  $15e^{3x} + \cos x$  C.  $15e^{3x} - \cos x$  D.  $2.66e^{3x} - \cos x$ 35. Evaluate  $\int \frac{X+2}{(X+1)^2} dx$ B.  $\log |X+2| - \frac{1}{X+2} + c$ A.  $\log |X+1| - \frac{1}{X+1} + c$ D.  $\log |X+2| - \frac{1}{X+1} + c$  $\log |X+1| - \frac{1}{X+2} + c$  $\left(\frac{dy}{dx}\right)^2 - x\frac{dy}{dx} + y = 0$  is 36. A solution of the differential equation C. y = 2x - 4 D. y = 2x + 4A. y = 2B. y = 2x

37. Which of the following is an expansion of  $e^{2x}$ ? A.  $1 + 2x + 2x^2 + 2x^3 + 2x^4 + \dots + 2x^4$ B.  $1 + 2x + 4x^2 + 8x^3 + 16x^4 + \dots + 2x^4$ C.  $1 + 2x + 2x^2 + \frac{4}{3}x^3 + \frac{2}{3}x^4 + \dots + 2x^4$ D.  $1 + \frac{x}{2} + \frac{x^2}{4} + \frac{x^3}{8} + \frac{x^4}{16} + \dots + 2x^4$ 

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. 
$$\lim_{n \to \infty} \frac{1^2 + 2^2 + \dots + n^2}{n^3} =$$
  
A. 1/6 B. 1/3 C. <sup>1</sup>/<sub>2</sub> D. None  
$$\lim_{x \to \infty} \left(1 + \frac{2}{n}\right)^x$$

of these

$$x \to \infty$$
 ( x) equals  
A. e B.  $\infty$  C. e<sup>2</sup> D. 1/e

42.

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

44.  $\frac{d^2 y}{dx^2} + \frac{dy}{dx} - 2y = 0$ has the solution A.  $y = c_1 e^{-2x} + c_2 e^{-x}$  B.  $y = c e^{-2x}$  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  $\vec{b} \vec{c} + \vec{c} \vec{a} + \vec{a} \vec{b}$  is equal to A. 19/2 B. -19/2 C. 29/2 D. -29/2

48. If <i>X</i> and <i>Y</i> are tw A. <i>X</i>	To sets, $X \cap (Y \cup X)^c$ B. Y	equals C. Ø	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 <i>n</i> sets each with three elements such that $S = \bigcup_{i=1}^{30} A_i = \bigcup_{j=1}^{n} B_j$ and each element of <i>S</i> 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 $f: R \to R$ 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 b	out not onto	
C. $f$ is not on-on	e but onto	D. $f$ is neither or	ne-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 o tower is 100 m h	n a level ground, the a igh, the distance of po	angle of elevation of th int P from the foot of the	e top tower is 30°. If the he tower is:	
A. 149 m	B. 156 m	C. 173 m	D. 200 m	
54. 3 pumps, workin must 4 pumps wo	g 8 hours a day, can e ork to empty the tank i	empty a tank in 2 days n 1 day?	. How many hours a day	
A. 16	B. 12	Č. 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 dif	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 leave passenger that the bus 9.35 am. At what time A. 9.15 AM C. 9.20AM	s every thirty m s has already let e did the enquiry	inutes from a bus sta it 10 minutes ago and clerk give this inforr B. 9.10 AM D. None of the	nd. An enquiry clerk told a d the next bus will leave at nation to the passenger? e Above
60.	The average noon tem Tuesday, Wednesday was $60^{\circ}$ find the poor	average noon temperature for Monday, Tuesday, and Wednesday was $53^{\circ}$ and for sday, Wednesday and Thursday was $56^{\circ}$ . If the noon temperature on Thursday $60^{\circ}$ find the noon temperature on Monday?		
	A. 52°	B. 51°	C. 54°	D. 53°
61.	Junk e-mail is also cal	lled		
	A. Spoof	B. Spam	C. Spool	D. Sniffer
62.	WAN stands for			
	A. Wap Area Networl	K	B. Wide Area	Network
	C. Wide Array Net		D. Wireless A	rea Network
63.	A computer cannot "b	oot" if it does n	ot have the	
	A. Compiler	B. Loader	C. Operating S	System D. Assembler
64.	The main component	of first generation	on computer was	
	A. Transistors		B. Vacuum Tu	ubes and Valves
	C. Integrated Circuits		D. None of ab	ove
65.	SMPS stands for	·		
	A. Switched Mode Po	wer Supply	B. Start Mode	Power Supply
	C. Store Mode Power	Supply	D. Single Mod	le Power Supply
66.	Which one of the follo	owing is NOT a	computer language?	
	A. LINUX	B. BASIC	C. COBOL	D. C++
67.	The ability to recover an example of a law e	and read deleted	d or damaged files fro wn as	om a criminal's computer is
	A. robotics		B. simulation	
	C. computer forensics		D. animation	
68.	Which of the followin	ig are the function	ons of an operating sy B Monitors activities	stem?
	C. Manages disks and	files	D. All of these	
69.	A file is of size 10 KE	Bytes. What is th	e size of the file in bi	ts?
	A. 10,000	d. 81,920	C. 10,240	D. 80,240
70.	In mode, the c time?	communication of	channel is used in bot	h directions at the same
	A. Full-duplex	B. Simplex	C. Half-duple:	D. None of these