647510 **0303212C4040** **Seat No :_____**

B.Sc.(IT) Semester - 2 (*CBCS*) Examination

March/April - 2024 (As Per Syllabus Year-2016)

MATHEMATICAL AND STATISTICAL FOUNDATION OF COMPUTER SCIENCE (CORE)

Time: 2:30 Hours **Marks: 70**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Que.1(A) Answer following Questions. (04)

(1) Evaluate the determinant A = $\begin{vmatrix} 2 & 3 \\ 1 & 4 \end{vmatrix}$

(2) Evaluate the determinant A = $\begin{vmatrix} -6 & 2 \\ -3 & 4 \end{vmatrix}$

(3) What is Determinant?

(4) Evaluate this determinant A = $\begin{vmatrix} 2 & 3 \\ 6 & 7 \end{vmatrix}$

Que.1(B) Answer Any One. (02)

(1) Evaluate 3×3 Determinant $\begin{vmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 4 & 9 \end{vmatrix}$

(2) Explain how to compute 2×2 order determinant with example.

Que.1(C) Answer Any One. (03)

(1) Solve for x & y using Cramer's method. 3x – 4y = 1, -2x + 5y = -3

(2) How to compute third order (3×3) determinant with example.

Que.1(D) Answer Any One. (05)

(1) Explain Properties of Determinants with example.

(2) Evaluate 3×3 Determinant $\begin{vmatrix} 2 & 3 & 4 \\ 2 & 7 & -7 \\ 4 & 9 & 1 \end{vmatrix}$

Que.2(A) Answer following Questions. (04)

(1) What is matrix?

(2) What is Row Matrix?

(3) What is Column Matrix?

(4) What is Diagonal Matrix?

Que.2(B) Answer Any One. (02)

(1) If A = $\begin{bmatrix} 2 & 3 \\ 1 & 5 \end{bmatrix}$ and B = $\begin{bmatrix} 1 & 2 \\ 5 & 6 \end{bmatrix}$ then find A+B.

(2) If A = $\begin{bmatrix} 1 & 2 & -1 \\ 3 & 1 & -10 \end{bmatrix}$, B = $\begin{bmatrix} -1 & 3 & 1 \\ -2 & 1 & -10 \end{bmatrix}$ then find A – B

Que.2(C) Answer Any One. (03)

(1) Find x, y, z if $\begin{bmatrix} x+y & 4z \\ 2y & x-y \end{bmatrix} = \begin{bmatrix} 6 & 8 \\ 3 & 3 \end{bmatrix}$

(2) If A = $\begin{bmatrix} 1 & 2 \\ 4 & 5 \end{bmatrix}$ and B = $\begin{bmatrix} 3 & 2 \\ 6 & 7 \end{bmatrix}$ then find AB & BA.

Que.2(D) Answer Any One. (05)

(1) If A = $\begin{bmatrix} 2 & 1 \\ 0 & 4 \end{bmatrix}$ B = $\begin{bmatrix} 3 & 2 \\ 4 & 1 \end{bmatrix}$ and C = $\begin{bmatrix} 2 & 4 \\ 1 & 4 \end{bmatrix}$ Verify that A (B+C) = AB + BC

(2) Find Inverse of A= $\begin{bmatrix} 2 & 3 & 1 \\ 1 & 2 & 3 \\ 3 & 1 & 2 \end{bmatrix}$

Que.3(A) Answer following Questions. (04)

(1) Father of set theory is_____.

(2) What is empty set or null set?

(3) What is intersection of set?

(4) What is union of set?

Que.3(B) Answer Any One. (02)

(1) A = {10, 20, 30} B = {30, 40} C = {30, 50, 60}
(A ∩ B) ∩ C = A ∩ (B ∩ C) Prove that.

(2) Explain Complement of a set.

Que.3(C) Answer Any One. (03)

(1) Find the co-ordinate of point which divides externally the join of The pair of the points A= (1, -2) B= (4, 7) in the ratio of 2:3.

(2) Find the area of triangle whose vertices are A (5, 7) B (-3, 4) and (2, 3)

Que.3(D) Answer Any One. (05)

(1) Show that the point (2, 2) (2, 4) (4, 4) (4, 2) are the vertices of square.

(2) Show that the point (2, 3) (4, 7) (6, 6) are the vertices of right angle triangle.

Que.4(A) Answer following Questions. (04)

(1) Find out Range of observation : 9,16,11,12,14,18,20,12

(2) Find out Median of observation: 16,29,32,37,39,42,45

(3) Find out Mean of observation: 32,39,42,45,48,49,51

(4) Find out Q1 of observation: 59,62,67,69,73,75,81

Que.4(B) Answer Any One. (02)

(1) Find out Quartile Deviation from the observation: 12,19,25,31,32,35,37,32

(2) Find the combined mean from the following data.

Group	I	II	III	IV
n_i	10	20	30	40
$\bar{x}_i$	15	10	12	20

Que.4(C) Answer Any One. (03)

(1) Explain Range and Standard Deviation.

(2) Find out mean, median and mode from the following:

x	15	25	35	45	50	55	60	65
f	6	7	9	15	20	18	12	8

Que.4(D) Answer Any One. (05)

(1) Find out mean, median and mode from the following:

Class	0-50	50-100	100-150	150-200	200-250	200-250	300-350	300-350
Freq.	7	15	18	20	25	16	9	6

(2) Find out Range, Co-efficient of Find out Range, Co-efficient of Range, Quartile Deviation and Co-efficient of Quartile Deviation from the following data:

Class	0-40	40-80	80-120	120-160	160-200	200-240	240-280	280-320
Freq.	12	9	20	25	32	22	23	17

Que.5(A) Answer following Questions. (04)

(1) Write the equation of n^{th} term A.P.

(2) Write the equation of n^{th} term G.P.

(3) Find 15^{th} term in G.P. 5,10,20,…….

(4) Find 18^{th} term in A.P. 2,4,6,8,……..

Que.5(B) Answer Any One. (02)

(1) Which term will be 124 in A.P. 4,9,14,19?

(2) The sum of 6 term in A.P. is 57 and the sum of its 10 terms is 155 find 20^{th} term.

Que.5(C) Answer Any One. (03)

(1) How many terms are there in an A.P. whose first and fifth terms are -14 and 2 respectively and the sum of terms is 40.

(2) The sum of 5^{th} and 7^{th} terms of an A.P. is 52 and the 10^{th} term is 46. Find the first term and the common difference

Que.5(D) Answer Any One. (05)

(1) The sum of three numbers in a G.P. is 28 and their product is 512. Find the numbers.

(2) Obtain the sum of the series 5+55+555+……upto n^{th} term.

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