647510 **BIT2FmsC104x** **Seat No :_____**

B.Sc.(IT) Semester - 2 (*CBCS*) Examination
March/April – 2023 (New Course)
Foundation of Mathematics and Statistics (CORE)

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

Instructions:

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

Q.1(A) Answer the following questions. **(03)**

1. What is determinant?

2. Evaluate this Determinant. $A = \begin{vmatrix} 3 & -7 \\ 2 & -1 \end{vmatrix}$

3. Evaluate this Determinant.$B = \begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix}$

Q.1(B) Answer the following questions. (Any Two) **(06)**

1. Solve for x & y using Cramer's method. $2x + 5y = 9, \quad 3x - y = 5.$

2. Evaluate this determinants. $A=\begin{vmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 4 & 9 \end{vmatrix}$

3. $B=\begin{vmatrix} 5 & -4 & 2 \\ 7 & -5 & 3 \\ -3 & 5 & 1 \end{vmatrix}$ evaluate this determinant.

4. Evaluate the determinant. $A = \begin{vmatrix} x & x+1 \\ x-1 & x \end{vmatrix}$

Q.1(C) Answer the following questions. (Any One) **(05)**

1. Solve for x & y using Cramer's method.
$x + y + z = 5, \quad 2x - 3y - 4z = -11, \quad 3x + 2y - z = -6.$

2. Explain Properties of Determinants with example.

Q.2(A) Answer the following questions. **(03)**

1. What is Row Matrix?

2. What is Unit Matrix?

3. $(A^{-1})^{-1}$=_____

Q.2(B) Answer the following questions. (Any Two) **(06)**

1. If $A = \begin{bmatrix} 2 & -1 \\ 3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 6 & 7 \\ 5 & 4 \end{bmatrix}$ Find the value of **(1)** 2A + 3B **(2)** 3A-2B

2. If $A = \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then prove that A^2= 3A- 2I

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

4. For the Matrix $AB=\begin{bmatrix} 2 & 4 \\ 3 & 5 \end{bmatrix}$ $ABC = \begin{bmatrix} 2 & -1 \\ 3 & 0 \end{bmatrix}$ then find c.

Q.2(C) Answer the following questions. (Any One) **(05)**

1. If $A =\begin{bmatrix} 2 & 1 \\ 0 & 4 \end{bmatrix}$ $B = \begin{bmatrix} 3 & 2 \\ 4 & 1 \end{bmatrix}$ $C = \begin{bmatrix} 2 & 4 \\ 1 & 4 \end{bmatrix}$ verify that A (B+C) = AB + AC

2. Find inverse of $A = \begin{bmatrix} 2 & 3 & 1 \\ 1 & 2 & 3 \\ 3 & 1 & 2 \end{bmatrix}$

Q.3(A) Answer the following questions. **(03)**

1. What is Singleton set?

2. Power set of A = {a, b, c}?

3. Father of set theory is_____.

Q.3(B) Answer the following questions. (Any Two) **(06)**

1. Find the co-ordinates of the point with divide A (-7, 4) & B (8, 9) Internally in the ratio of (2:3).
2. Find the distance between P (-1, 4) Q (2, 8) along with diagram.
3. Find the area of triangle whose vertices are A (2,-1) B (-3, -4) and (0, 2)
4. Prove that $(A \cap B)' = A' \cup B'$ with any set of element.

Q.3(C) Answer the following questions. (Any One) **(05)**

1. Show that the point (3,2)(5,4)(3,6)(1,4) are the vertices of square.
2. Prove de' Morgan's law

   $(A \cup B)' = A' \cap B'$

   $(A \cap B)' = A' \cup B'$

Q.4(A) Answer the following questions. **(03)**

1. Mode is denoted by……
2. What is the mode in : 10,20,30,50,50, 20.
3. Median value of 4,5,3,2,3,4,5,4,5 is …..

Q.4(B) Answer the following questions. (Any Two) **(06)**

1. Explain Merit and Demerit of Mean.
2. Find Mean, Median and Mode for the following data :

Marks obtained	20	25	28	29	33	38	42	43
Number of students (Frequency)	6	20	24	28	15	4	2	1

3. Find an estimate of the variance and standard deviation of the following data for the marks obtained in a test by 88 students.

Marks (x)	0-10	10- 20	20-30	30-40	40- 50
Frequency (f)	6	16	24	25	17

4. Find out Quartile Deviation and Co-efficient of Quartile Deviation:

x	15	20	25	30	35	40	45
f	12	16	18	20	22	23	25

Q.4(C) Answer the following questions. (Any One) **(05)**

1. The following table shows the ages of the patients admitted in a hospital during a year:

Age (in years)	5-15	15-25	25-35	35-45	45-55	55-65
No. of Students	6	11	21	23	14	5

   Find out Mean, Median and Mode.

2. 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.	9	15	22	29	31	26	24	19

Q.5(A) Answer the following questions. **(03)**

1. Write an equation of nth term A.P.
2. Find the 5 the term in G.P. 1,3,9,…….
3. Find 10 the term in A.P. 5,10,15……..

Q.5(B) Answer the following questions. (Any Two) **(06)**

1. For an A.P. $T_6 = 47$ and $T_{10} = 10$ then find T_{30}.
2. The sum of six terms in A.P. is 12 and the sum of sixteenth terms is 24, find the first term and the common difference.
3. If the second term of a G.P. be 18 and its sixth term be 1,458 then find the first term, common ratio and the G.P.
4. How many terms of the A.P. 1,4,7…….. are needed to the sum 715?

Q.5(C) Answer the following questions. (Any One) **(05)**

1. The sum of the three terms in A.P. in 27 and their product is 693. Find the numbers.
2. Obtain the sum of the series 7+77+777+……upto n^{th} term.

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