

B.C.A Semester - 2 (CBCS) Examination
March/April – 2024 (As Per Syllabus Year-2018)
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.

Que.1(A) Answer following Questions.

(03)

- (1) Evaluate this Determinant. $A = \begin{vmatrix} 5 & 1 \\ 2 & 6 \end{vmatrix}$
- (2) The value of Determinant remain _____ (change/unchanged) if its Row are changed in to column and column in to row.
- (3) Evaluate this Determinant. $B = \begin{vmatrix} 6 & 2 \\ 5 & 2 \end{vmatrix}$

Que.1(B) Answer Any Two.

(06)

- (1) How to compute (3×3) third order Determinant with example.
- (2) Evaluate following determinants. $A = \begin{vmatrix} 25 & 5 & 1 \\ 64 & 8 & 1 \\ 144 & 12 & 1 \end{vmatrix}$
- (3) Solve for x & y using Cramer's method $X - 5y = 0$, $3x + y = 16$
- (4) Evaluate following determinants. $A = \begin{vmatrix} 5 & 1 & 1 \\ -11 & -3 & -4 \\ -6 & 2 & -1 \end{vmatrix}$

Que.1(C) Answer Any One.

(05)

- (1) Solve for x, y and z using Cramer's method. $2x + 3y + z = 9$, $x + 2y + 3z = 8$, $3x + y + 2z = 7$.
- (2) Prove that $\begin{vmatrix} 7 & 10 & 14 \\ 9 & 12 & 16 \\ 1977 & 1980 & 1984 \end{vmatrix} = 0$.

Que.2(A) Answer following Questions.

(03)

- (1) What is Scalar Matrix?
- (2) What is Equal Matrix?
- (3) Formula of $A^{-1} =$ _____.

Que.2(B) Answer Any Two.

(06)

- (1) If $A = \begin{bmatrix} 1 & 2 & 0 \\ 1 & 1 & 0 \\ -1 & 4 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 1 & 4 & 9 \end{bmatrix}$ then show that $AB = 0$.
- (2) If $A = [2, -3, 5]$ and $B = \begin{bmatrix} -2 \\ 4 \\ 3 \end{bmatrix}$ then find AB and BA .
- (3) If $A = \begin{bmatrix} 2 & 1 \\ 0 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 2 \\ 4 & 1 \end{bmatrix}$ $C = \begin{bmatrix} 2 & 4 \\ 1 & 4 \end{bmatrix}$ verify that $A(B + C) = AB + AC$.
- (4) Find Inverse of $A = \begin{bmatrix} 4 & 3 \\ 2 & 4 \end{bmatrix}$.

Que.2(C) Answer Any One.

(05)

- (1) If $A = \begin{bmatrix} 1 & 2 & 1 \\ 0 & 1 & -1 \\ 3 & -1 & 1 \end{bmatrix}$ Then show that $A^3 - 3A^2 - A + 9I_3 = 0$.
- (2) Find inverse of $A = \begin{bmatrix} 2 & -1 & 3 \\ 4 & 2 & 0 \\ -1 & 3 & -2 \end{bmatrix}$

Que.3(A) Answer following Questions.

(03)

- (1) Formula of Distance between two point D =?
- (2) Power set of $A = \{1, 2, 3\}$ =?
- (3) Father of set theory is_____.

Que.3(B) Answer Any Two. (06)

- (1) Show that the set points A (1, -1), B (2, 1) & C (4, 5) are co-linear.
- (2) Prove that the triangle at the points (0, 3) (-2, 1) (-1, 4) is right angle triangle.
- (3) $A=\{1, 2\}$ $B=\{2, 3\}$ $C=\{3, 4, 5\}$ prove that $(A \cup B) \cup C = A \cup (B \cup C)$.
- (4) If $A=\{X/3 \leq X \leq 8, X \in N\}$ $B=\{X/0 < X \leq 4, X \in N\}$ Then verify that $A \cup B = (A - B) \cup C$.

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

- (1) In a committee 50 People speak Gujarati, 20 people speak English, And 10 people speak both Gujrat and English. How many people speak at least one of these two language?
- (2) Show that the point (2, 3) (4, 7) (6, 6) are the vertices of right angle triangle.

Que.4(A) Answer following Questions. (03)

- (1) Mean of observation 10, 20, 30, 40, 50.....
- (2) Write down formula of Range.....
- (3) Q_1 of observation 1, 2, 3, 4, 5, 6, 7.....

Que.4(B) Answer Any Two. (06)

- (1) Find out Standard Deviation and Range, Co-efficient of Range from the following :

x	100	200	300	400	500	600	700
f	9	12	16	20	21	15	10

- (2) Write down merit and demerit of Mean.
- (3) Find out Mean, Median and Mode from the following:

x	10	15	20	25	30	35	40
f	6	9	11	15	9	8	5

- (4) Find out Rang, Co-efficient of Rang, Co-efficient of Quartile Deviation from following:

x	50	55	60	65	70	75	80
f	7	12	15	19	16	11	8

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

- (1) Find out Mean, Median and Mode from the following:

Class	0-100	100-200	200-300	300-400	400-500	500-600	600-700
Freq.	7	9	12	16	19	10	7

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

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Freq.	5	11	15	18	22	20	15	9	5

Que.5(A) Answer following Questions. (03)

- (1) Find T_{16} in 2, 4, 8,.....
- (2) Find T_7 in 6, 12, 18,.....
- (3) Write equation of n^{th} term in A.P.

Que.5(B) Answer Any Two. (06)

- (1) The first term of an A.P. is -2 and the tenth term is 16. Find fiftieth term.
- (2) The sum of 5th and 7th terms of an A.P. is 52 and the 10th term is 46. Find the first term and the common difference.
- (3) Calculate the sum of the first 20 terms of the following AP: $S = 190 + 167 + 144 + 121 + \dots$
- (4) If the first term of an AP is 67 and the common difference is -13, find the sum of the first 20 terms.

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

- (1) Obtain the sum of the series $6+66+666+\dots$ upto n^{th} term.
- (2) The sum of the three terms in A.P. in 24 and their product is 440. Find the numbers.
