

B.C.A Semester - 2 (CBCS) Examination
March/April - 2024 (As Per Syllabus Year-2016)
CS-10 MATH. & STAT. FOUND. OF COMP. 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) What is Determinant?
 - (2) Evaluate the determinant $A = \begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix}$
 - (3) If any two rows or two columns are identical then the value of determinant is _____.
 - (4) Evaluate this determinant $A = \begin{vmatrix} 9 & 4 \\ -3 & 2 \end{vmatrix}$
- Que.1(B) Answer Any One. (02)
- (1) Evaluate 3×3 Determinant $\begin{vmatrix} 1 & 4 & 4 \\ 2 & 3 & 1 \\ 1 & 2 & 1 \end{vmatrix}$
 - (2) 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. $2x + 5y = 9$, $3x - y = 5$
 - (2) Evaluate this determinant $\begin{vmatrix} 5 & -3 \\ 101 & 201 \end{vmatrix}$
- Que.1(D) Answer Any One. (05)
- (1) Explain Properties of Determinants with example.
 - (2) Solve for x, y & z using Cramer's method. $2x + y - z = 2$, $x + 2y + z = 5$, $x + y + 2z = 3$.
- Que.2(A) Answer following Questions. (04)
- (1) What is Matrix?
 - (2) What is Square Matrix?
 - (3) Why matrix is required?
 - (4) $AA^{-1} = \text{_____} = I$.
- Que.2(B) Answer Any One. (02)
- (1) $A = \begin{bmatrix} 2 & 3 & 2 \\ 5 & 1 & 6 \end{bmatrix}$ find $2(A)$.
 - (2) If $A = \begin{bmatrix} 5 & 7 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 2 \\ 1 & 3 \end{bmatrix}$ then find $A - B$
- Que.2(C) Answer Any One. (03)
- (1) If $\begin{bmatrix} 1 & 2 & -1 \\ 3 & 1 & -10 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 3 & 1 \\ -2 & 1 & -10 \end{bmatrix}$ then find (1) $A + B$ (2) $A - B$
 - (2) $A = \begin{bmatrix} 1 & 0 \\ 1 & 2 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ Prove that $A^2 = 3A - 2I$
- Que.2(D) Answer Any One. (05)
- (1) Using the definition of equalities of matrix find the values of a, b, c, x, y, z if

$$\begin{bmatrix} x+3 & 2y-8 & z+2 \\ a+1 & 4x+6 & 0 \\ b-3 & 3b & z+2c \end{bmatrix} = \begin{bmatrix} 0 & -6 & 3z-2 \\ -3 & 2x & 2c+2 \\ 2b+4 & -21 & 0 \end{bmatrix}$$
 - (2) For the matrix $A = \begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 6 \\ -3 & 2 \end{bmatrix}$ Prove that $(AB)^{-1} = B^{-1}A^{-1}$
- Que.3(A) Answer following Questions. (04)
- (1) Power set of $A = \{x, y, z\}$?
 - (2) Father of set theory is _____.
 - (3) What is empty set or null set?
 - (4) What is Finite set?

- Que.3(B) Answer Any One. (02)
 (1) Find the distance between P (-1, 4) Q (2, 8) along with diagram.
 (2) Explain union of set.
- Que.3(C) Answer Any One. (03)
 (1) Find the co-ordinate of the point which divides the join of Points (2, 1) B= (4, 5) internally in the ratio of 2:3.
 (2) Find the area of triangle whose vertices are A(2, -1) B(-3, -4) C(0, 2)
- Que.3(D) Answer Any One. (05)
 (1) Prove that de' Morgan's law $(A \cup B)' = A' \cap B'$
 (2) Prove that (3, 2) (5, 4) (3, 6) (1, 4) are the vertices of square.
- Que.4(A) Answer following Questions. (04)
 (1) Mean is Denoted by.....
 (2) Mode of observation 1,2,3,4,5.....
 (3) Median of observation 10,4,5,2,3
 (4) Write down equation of Quartile Deviation
- Que.4(B) Answer Any One. (02)
 (1) Find out Q_3 and Q_1 of observation 1,2,3,4,5,6,7,8,9,10,11
 (2) Find out Range and Co-efficient of Range of observation 10,4,2,5,6,12
- Que.4(C) Answer Any One. (03)
 (1) Find out Mean, Median and Mode from the following:
- | | | | | | |
|---|---|----|----|----|----|
| X | 4 | 6 | 9 | 10 | 15 |
| F | 5 | 10 | 10 | 7 | 8 |
- (2) Find out Standard Deviation and Variance from the following:
- | | | | | | | | |
|---|---|---|----|----|----|----|----|
| X | 4 | 8 | 11 | 17 | 20 | 24 | 32 |
| F | 3 | 5 | 9 | 5 | 4 | 3 | 1 |
- Que.4(D) Answer Any One. (05)
 (1) Find out Mean, Median and Mode from the following:
- | | | | | | | |
|-------|------|-------|-------|-------|-------|-------|
| Class | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
| Freq. | 2 | 6 | 9 | 7 | 4 | 2 |
- (2) Find out Quartile Deviation, Co-efficient of Quartile Deviation, and Standard 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 |
- Que.5(A) Answer following Questions. (04)
 (1) Write formula of n^{th} term in G.P.
 (2) Find 13th term in 2,4,6,8,.....,n
 (3) Find 7th term in 1,5,25,.....,n
 (4) Write formula of n^{th} term in A.P.
- Que.5(B) Answer Any One. (02)
 (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.
- Que.5(C) Answer Any One. (03)
 (1) The Third term of an A.P. is 25 and the tenth term is -3. Find fortieth term.
 (2) Determine the 21st term of an A.P. whose 9th term is -6 and the common difference is $\frac{5}{4}$.
- Que.5(D) Answer Any One. (05)
 (1) Obtain the sum of the series $8+88+888+\dots$ upto n^{th} term.
 (2) The sum of the three terms in A.P. is 24 and their product is 440. Find the numbers
