

B.C.A Semester - 2 (CBCS) Examination**June/July-2022 [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 the determinant of $\begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix}$ = _____
2. What is determinant?
3. What is the determinant of $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ = _____

Q.1(B) Attempt the following question. (any two) (06)

1. Explain 2×2 order determinant with example.

2. What is the determinant of $\begin{bmatrix} 5 & -2 & 1 \\ 6 & -1 & -4 \\ 3 & 7 & 5 \end{bmatrix}$

3. Find determinant of the following.

(A) $A = \begin{bmatrix} 7 & 2 \\ 3 & 2 \end{bmatrix}$ (B) $A = \begin{bmatrix} 9 & -1 \\ -3 & -2 \end{bmatrix}$

4. What is the determinant of $A = \begin{bmatrix} 3 & -4 & -1 \\ 7 & -2 & 1 \\ 9 & 2 & 3 \end{bmatrix}$

Q.1(C) Attempt the following question. (any one) (05)

1. Explain properties of determinant.
2. Explain 3×3 order determinant with example.

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

1. What is unit matrix?
2. If $A = \begin{bmatrix} 3 & -1 \\ 4 & 5 \end{bmatrix}$ $B = \begin{bmatrix} -2 & 1 \\ 3 & -2 \end{bmatrix}$
Then find $A-B$ = _____
3. What is null matrix?

Q.2(B) Attempt the following question. (any two) (06)

1. $A = \begin{bmatrix} 3 & 2 & 1 \\ 2 & 1 & 1 \\ 1 & 2 & 1 \end{bmatrix}$ $B = \begin{bmatrix} 4 & 1 & 3 \\ 5 & 2 & 1 \\ 1 & 1 & 2 \end{bmatrix}$ Find AB & BA .

2. If $A = [2 \ -4 \ 3]$ and $B = \begin{bmatrix} -5 \\ 3 \\ 2 \end{bmatrix}$ then find BA .

3. $A = \begin{bmatrix} 1 & 2 & -3 \\ 1 & -2 & 3 \\ -1 & 2 & 3 \end{bmatrix}$ find A^2

4. $X = \begin{bmatrix} 5 & 1 \\ 0 & 2 \end{bmatrix}$ $Y = \begin{bmatrix} -2 & 0 \\ 1 & 3 \end{bmatrix}$ $Z = \begin{bmatrix} 3 & 1 \\ 2 & 7 \end{bmatrix}$ then prove that $X(Y+Z) = XY + XZ$.

Q.2(C) Attempt the following question. (any one) (05)

1. Find inverse of the following.

(A) $A = \begin{bmatrix} 3 & -4 & 1 \\ 2 & -2 & 1 \\ 1 & 1 & -2 \end{bmatrix}$ (B) $A = \begin{bmatrix} 3 & 1 & 1 \\ -2 & 1 & -2 \\ 3 & 2 & 1 \end{bmatrix}$

2. $A = \begin{bmatrix} 0 & 1 & 2 \\ 2 & -3 & 0 \\ 1 & 1 & -1 \end{bmatrix}$ then find $A^3 + 4A^2 - A$.

Q.3(A) Answer the following question. (03)

1. How many methods are available for representation of sets?
2. What is singleton set?
3. What is directed line?

Q.3(B) Attempt the following question. (any two) (06)

1. Prove that $(A \cap B) \cap C = A \cap (B \cap C)$.
2. $A = \{3, 4\}$ $B = \{8, 9\}$ $C = \{3, 5\}$
Prove that $A \times (B \cap C) = (A \times B) \cap (A \times C)$
3. Find the ratio in which the points C(-2, -2) divides the join point A(4, 4) and B(8, 8)
4. Find the area of triangle whose vertices are A(-3, -2), B(-1, -2) and C(0, 5).

Q.3(C) Attempt the following questions. (any one) (05)

1. Prove De-Morgan's Law.
(A) $(A \cup B)' = A' \cap B'$.
(B) $(A \cap B)' = A' \cup B'$.
2. Show that (2, 2), (2, 4), (4, 4) and (4, 2) are the vertices of a square.

Q.4(A) Answer the following question. (03)

1. Which symbol is use to define mean?
2. What is median?
3. What is the mode of the following data.
59, 6, 4, 5, 3, 59, 6, 2, 7, 6.

Q.4(B) Attempt the following question. (any two) (06)

1. Explain advantages & disadvantages of median.
2. Find the mode for following data.

Class	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Freq.(f)	25	28	24	33	37	34	3	7

3. Calculate quartile deviation for discrete series.

X	1	3	5	7	9
F	3	12	18	12	5

4. Calculate standard deviation for following frequency.

X	6	7	8	9	10	11	12
F	3	9	15	17	5	3	2

Q.4(C) Attempt the following question. (any one) (05)

1. Calculate mean, median & mode for following data.

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Freq.(f)	5	7	8	11	9	4	3

2. Calculate range, co-efficient of range, quartile deviation, co-efficient of quartile deviation.

X	10	20	30	40	50	60	70
F	5	10	15	25	20	12	6

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

1. What is sequence?
2. Write the equation to find n^{th} term in arithmetic progression.
3. In geometric progression 5, 10, 20, 40 find 10^{th} term.

Q.5(B) Attempt the following question. (any two) (06)

1. The third term of A.P. is 12 and sixth term is 42, then find thirty sixth term.
2. The sum of the three terms in A.P. is 15 and sum of their square is 83, then find the numbers.
3. The first term of a G.P. is 50 and 4^{th} term is 1350. Then find 7^{th} term.
4. If the 3^{rd} term of G.P. is 3 and 6^{th} term is 81. Find the sum of its first 10 values.

Q.5(C) Attempt the following question. (any one) (05)

1. Find the three numbers in G.P. such that their sum is 130 and their product is 27,000.
2. If $\frac{a}{b+c}, \frac{b}{c+a}, \frac{c}{a+b}$ are in A.P. prove that a^2, b^2, c^2 are also in A.P.
