

**THIRD SEMESTER B.Sc./B.M.M.C. DEGREE EXAMINATION
NOVEMBER 2015**

(CUCBCSS—UG)

Common Course

A 11—BASIC NUMERICAL SKILLS

Time : Three Hours

Maximum : 80 M

Part I

*Answer all questions in this part.
Each question carries 1 mark.*

Choose the correct answer from the choices given :

1. When are two sets A and B said to be disjoint?

(a) $A \cap B = \emptyset$.

(b) $A \cap B \neq \emptyset$.

(c) $A \cup B = \emptyset$.

(d) $A \cup B \neq \emptyset$.

2. The arithmetic mean between 2 and 8 is :

(a) 10.

(b) 6.

(c) 5.

(d) 16.

3. If a matrix has 13 elements, what are the possible dimensions (orders) it can have ?

(a) $1 \times 13, 13 \times 1$.

(b) 13×1 .

(c) 1×3 .

(d) 13×13 .

4. Statistics are :

(a) Aggregate of fact.

(b) Systematically collected.

(c) Numerically expressed.

(d) All these.

5. For a distribution mean = 20, mode = 25, SD = 10, then coefficient of skewness is :

(a) 0.

(b) $-.05$.

(c) 0.5.

(d) 1.

Fill in the blanks :—

6. The geometric mean between a and b is _____.

7. A set which doesn't contain any element is called _____.

8. If a, b, c are in GP, then $b^2 = \underline{\hspace{2cm}}$.
9. The measure of dispersion based on all the observations of the series is $\underline{\hspace{2cm}}$.
10. The sales of a departmental store on Onam and Christmas are associated with the components of time series is $\underline{\hspace{2cm}}$.

(10 × 1 = 10 marks)

Part II

*Answer any eight questions.
Each question carries 2 marks.*

11. Prove $A \cap B = B \cap A$.
12. Solve $x^2 + 10x + 21 = 0$.
13. Which term in the AP 5, 2, -1, is -22?
14. What is a power set? State the relation between cardinalities of a finite set and its power set.
15. If $A = \begin{bmatrix} 1 & 3 & 4 \\ 2 & 6 & 8 \\ 0 & 7 & 5 \end{bmatrix}$, find $A \times I_3$.
16. Define consumer price index number.
17. Define Kurtosis.
18. Eight coins were tossed together. The number of heads obtained is given below. Find the mean :
- | | | | | | | | | | |
|----------------|---|---|----|----|----|----|----|---|---|
| No. of heads : | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| No. of times : | 1 | 9 | 26 | 59 | 72 | 52 | 29 | 7 | 1 |
19. Define variance.
20. Why Arithmetic mean is considered to be the best average?

(8 × 2 = 16 marks)

Part III

*Answer any six questions.
Each question carries 4 marks.*

21. Using Venn diagram, proved $A \cap (B \cap C) = (A \cap B) \cap C$ and $A \cup (B \cup C) = (A \cup B) \cup C$.

22. If $A = \begin{bmatrix} 3 & -5 \\ -4 & 2 \end{bmatrix}$, prove that A satisfies the equation $x^2 - 5x - 14 = 0$.

23. Find the middle term in the AP 20, 16, 12,, - 176.

24. Solve the following systems of simultaneous equation :

$$3x + 4y = 37, 8x + 5y = 76$$

Using :

(a) Elimination method : (b) Substitution method.

25. Find $f(A)$ if $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$, where $f(x)$ is given by $f(x) = x^2 - 5x + 6$.

26. Explain the components of time series.

27. An economy grows at the rate of 2 % in the first year, 2.5 % in the second year, 3 % in the third year, 4 % in the fourth year, 5 % in the fifth year, 6 % in the sixth year ——— and 10 % in the tenth year. What is the average rate of growth of the company ?

28. Find coefficient of variation :

Age	:	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
No. of persons	:	15	30	53	75	100	110	115	125

(6 × 4 = 24 marks)

Part IV

Answer any two questions.
Each question carries 15 marks.

29. Solve the following equations by matrix method :

$$2x + 3y + 3z = 5$$

$$x - 2y + z = -4$$

$$3x - y - 2z = 3.$$

$$A \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{pmatrix} 5 \\ -4 \\ 3 \end{pmatrix}$$

Turn over

30. Calculate the appropriate measure of skewness for the following data :

Income	:	below 100	100 - 139	140 - 179	180 - 219	220 - 259	260 - 299
No. of workers	:	10	16	39	48	60	46
Income	:	300 - 339	340 and above				
No. of workers	:	22	9				

31. Use Cramer's rule to solve :

$$x + y + z = 7$$

$$2x + y + 3z = 16$$

$$3x + 3y - z = 5$$

(2 × 15 = 30 marks)

$D_1, D_2, D_3,$

(A)

$$\frac{D_1}{D} \quad \frac{D_2}{D} \quad \frac{D_3}{D}$$