

**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 Marks

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) $A \cap B = \emptyset$.

(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 x 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, \dots 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 x 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 $A = \begin{vmatrix} 3 & -5 \\ -4 & 2 \end{vmatrix}$, 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 $A = \begin{vmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{vmatrix}$, 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 x 4 = 24 marks)

Part IV

*Answer any two questions.
Each question carries 15 marks.*

29. Solve the following equations by matrix method :

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

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

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

N. Calculate the appropriate measure of skewness for the following data

| | | | | | |
|----------------|---------|---------------|---------|---------|---------|
| Income | 100-139 | 140-179 | 180-219 | 220-259 | 260-299 |
| No. of workers | 39 | 48 | 60 | 46 | 19 |
| Income | 300-339 | 340 and above | | | |
| No. of workers | 19 | 12 | | | |

31. Use Crum's rule to solve

(2x 15 = 30 marks)