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(Pages : 4)

Name..... 08

Reg. No.....

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) $A \cap B = \varnothing$.

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

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

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

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) 1×13, 13×1.

   (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 _____.

Turn over

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

(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 mark

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 :

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

$x - 2y + z = -4$

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

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)