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D3BCM2101 (PAGES 3) Reg.No.....

Name: .....

THIRD SEMESTER UG DEGREE EXAMINATION, NOVEMBER 2022

(Regular/Improvement/Supplementary)

B.Com/BBA

GBCM3A01T: BASIC NUMERICAL METHODS

Time: 2 ½ Hours **Maximum Marks: 80**

SECTION A: Answer the following questions. Each carries *two* marks.

(Ceiling 25 Marks)

1. Two-third of a number increased by 5 equals 27. Find the number.
2. If $A = \begin{bmatrix} 6 & 0 & 7 \\ 7 & -2 & 3 \end{bmatrix}$ Calculate 3A.
3. Determine the AP, whose 3rd term is 5 and 6th term is 8.
4. In a moderately asymmetrical distribution, the mode and mean are 32.1 and 35.4 respectively. Determine the Median
5. What is meant by the term, 'Annuity'?
6. Calculate the Effective interest rate, if the interest is calculated @ 8% quarterly.
7. Define the 'Rank of Matrix'.
8. Solve: $y^2 - y = 7$.
9. Compute the Range and Coefficient of Range for the following values:
   25, 32, 85, 32, 42, 10, 20, 18, 28.
10. Mr. X needs ₹. 5000 at the end of the 5th year from now. How much amount should he invest in bank now, if it earns interest @ ₹. 12 per annum compound?
11. Three numbers in ascending order are in GP such that their product is 512. Identify the middle number.
12. State the essence of Lorenz Curve.
13. Karl Pearson's Coefficient of Skewness of a distribution is 0.32. Its SD is 6.5 and mean is 29.6. Determine the median and mode of the distribution.
14. Prove that $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is idempotent.
15. Clarify the differences between Leptokurtic, Mesokurtic and Platykurtic distributions.

(PTO)

SECTION B: Answer the following questions. Each carries *five* marks.

(Ceiling 35 Marks)

16. The mean wage of 100 labourers working in a factory of running 2 shifts of 60 and 40 workers respectively is ₹. 38. The mean wage of 60 labourers working in morning shift is ₹. 40. Determine the mean wage of labourers working in evening shift.
17. If the 5^{th} and 10^{th} terms of a GP are 32 and 1024 respectively. Ascertain the 1^{st} term and common ratio.
18. Estimate the QD and its coefficient from the following details:

Wages (₹.)	Below 5	Below 10	Below 15	Below 20	Below 25	Below 30
No. of students	4	10	13	21	33	40

19. From the following data, Calculate the value of HM:

Income (₹.)	**No. of Persons**
10-20	4
20-30	6
30-40	10
40-50	7
50-60	3

20. What is the inverse of A; where $A = \begin{bmatrix} 3 & 5 & 7 \\ 2 & -3 & 1 \\ 1 & 1 & 2 \end{bmatrix}$

21. Let $A = \begin{bmatrix} 2 & 5 \\ -3 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & -5 \\ 3 & k \end{bmatrix}$. What is the value of 'k', assuming AB=BA.

22. Compute the Compound interest on ₹. 8,000 for 4 years; if interest is payable half-yearly for the first 3 years at the rate of 8% per annum and for the 4^{th} year, the interest is payable quarterly at the rate of 6% per annum.
23. Solve the following equations using Cramer's Rule: $2x + 3y = 7$; $3x + 5y = 9$

SECTION C: Answer any 2 question. Each carries *ten* marks.

24. Solve the equation:

$$x^{10} - 33x^5 + 32 = 0.$$

25. The sum of three numbers in AP is 15. If 1,3 and 9 are added to them respectively, then the resulting numbers are in GP. Identify these numbers.

26. The scores of 2 batsmen A and B during a certain match are as follows:-

Batsman A	10	12	80	70	60	100	0	4
Batsman B	8	9	7	10	5	9	10	8

Examine which of these two batsmen is more consistent in scoring and why?

27. Let $A = \begin{bmatrix} 0 & 6 & 7 \\ -6 & 0 & 8 \\ 7 & -8 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 2 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 2 \\ -2 \\ 3 \end{bmatrix}$, Verify that

$(A + B)\,C = AC + BC.$

(2 × 10 = 20 Marks)