

**FIFTH SEMESTER B.A./B.Sc./B.Com./B.B.A. DEGREE EXAMINATION
NOVEMBER 2016**

(CUCBCSS—UG)

Open Course

MAT 5D 18—MATHEMATICS FOR NATURAL SCIENCE

Time : Two Hours

Maximum : 40 Marks

Section A

*Answer all the six questions.
Each question carries 1 mark.*

1. What you mean by the mode of a set of numbers.
2. Find the arithmetic mean of 84, 91, 72, 68, 87, 78.
3. Arrange the numbers 17, 45, 38, 27, 6, 48, 11, 57, 34, and 22 in an array.
4. If 5, 8, 6, and 2 occur with frequencies 3, 2, 4, and 1, respectively, the arithmetic mean is
5. Define Kurtosis of a distribution.
6. Define skewness of a distribution.

(6 x 1 = 6 marks)

Section B

*Answer any five out of seven questions.
Each question carries 2 marks.*

7. Solve the logarithmic equation $\log_4 (x + 5) = 3$.
8. Prove that the sum of the deviations of X_1, X_2, \dots, X_N from their mean \bar{X} is equal to zero.
9. Prove that the quadratic mean of two positive unequal numbers a and b is greater than their geometric mean.
10. Find the mean deviation of the set 2, 3, 6, 8, 11.
11. Find the (a) first ; and (b) second moments about the mean for the set of numbers 2, 3, 7, 8, 10.
12. Find the standard deviation s of the set 12, 6, 7, 3, 15, 10, 18, 5.

Turn over

13. A student received a grade of 84 on a final examination in mathematics for which the mean grade was 76 and the standard deviation was 10. On the final examination in physics, for **which** the mean grade was 82 and the standard deviation was 16, she received a grade of 90. In which subject was her relative standing higher ?

(5 x 2 = 10 marks)

Section C

Answer any **three** out of five questions.
Each question carries **4** marks.

14. What is the maximum error in each of the following measurements, assuming that they are recorded accurately ?
- 73.854.
 - 0.09800 cubic feet (ft^3).
 - 3.867×10^8 kilometers (km).
15. Solve each of the following equations :—
- $4a - 20 = 8$.
 - $3X + 4 = 24 - 2X$.
 - $18 - 5b = 3(b + 8) + 10$.
 - $\frac{Y+3}{2} + 1 = \frac{Y}{2}$.
16. Solve the equation for x, $2 \log(x + 1) - 3 \log(x + 1) = 2$.
17. The number of ATM transactions per day were recorded at 15 locations in a large city. The data were 35, 49, 225, 50, 30, 65, 40, 55, 52, 76, 48, 325, 47, 32 and 60. Find :
- The median number of transactions.
 - The mean number of transactions.
18. During *one* year the ratio of milk prices per quart to bread prices per loaf was 3.00, where as during the next year the ratio was 2.00.
- Find the arithmetic mean of these ratios for the 2-year period.
 - Find the arithmetic mean of the ratios of bread prices to milk prices for the 2-year period.
 - Discuss the advisability of using the arithmetic mean for averaging ratios.
 - Discuss the suitability of the geometric mean for averaging ratios.

(3 x 4 = 12 marks)

Section D

Answer any two out of three questions.

Each question carries 6 marks.

19. Table shows a frequency distribution of the weekly wages of 65 employees at the PR Company. With reference to this table, determine.

- (a) The lower limit of the sixth class.
- (b) The upper limit of the fourth class.
- (c) The class mark (or class midpoint) of the third class.
- (d) The class boundaries of the fifth class.
- (e) The size of the fifth-class interval.
- (f) The frequency of the third class.
- (g) The relative frequency of the third class.
- (h) The class interval having the largest frequency.
- (i) The percentage of employees earning less than 280.00 rupees per week.

<i>Wages Employees (in rupees)</i>	<i>Number of employees</i>
250.00 – 259.99	8
260.00 – 269.99	10
270.00 – 279.99	16
280.00 – 289.99	14
290.00 – 299.99	10
300.00 – 309.99	5
310.00 – 319.99	2

20. Verify the relation $m_3 = \frac{m_3'}{3} - 3m_1' \frac{m_2'}{2} + m_1'^3$ for the set of numbers 2, 3, 7, 8, 10 where m_i denotes the moment about the mean and m_i' denotes the moments about 4.

Turn over

21. Find the (a) Quartile ; and (b) Percentile coefficients of skewness for the distribution of heights of 100 students in the following table.

<i>Height (in)</i>	<i>Frequency (f)</i>
60 – 62	5
63 – 65	18
66 – 68	42
69 – 71	27
72 – 74	8

(2 x 6 = 12 marks)