

C 30310

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Name.....

Reg. No.....

**FIFTH SEMESTER B.A./B.Sc./B.Com./B.B.A. DEGREE EXAMINATION
NOVEMBER 2017**

(CUCBCSS—UG)

Open Course

MAT 5D 18—MATHEMATICS FOR NATURAL SCIENCES

Time : Two Hours

Maximum : 40 Marks

Section A

Answer all the six questions.

Each question carries 1 mark.

1. What you mean by the median of a set of numbers.
2. A distribution having only one mode is called _____.
3. Find the quadratic mean of the numbers 3, 5, 6, 6, 7, 10 and 12.
4. Define Kurtosis of a distribution.
5. Write the empirical relation between mean deviation and standard deviation.
6. Define the semi-interquartile range.

(6 × 1 = 6 marks)

Section B

Answer any five out of seven questions.

Each question carries 2 marks.

7. (a) Arrange the numbers 17, 45, 38, 27, 6, 48, 11, 57, 34 and 22 in an array.
(b) Determine the range of these numbers.
8. If $Z_1 = X_1 + Y_1, Z_2 = X_2 + Y_2 ; \dots ; Z_N = X_N + Y_N$, prove that $\bar{Z} = \bar{X} + \bar{Y}$.
9. Find the mean deviation of the set of numbers 12, 6, 7, 3, 15, 10, 18, 5.
10. The bacterial count in a certain culture increased from 1000 to 4000 in 3 days. What was the average percentage increase per day ?
11. Solve the following logarithmic equation. $\log(6y - 7) + \log y = \log 5$.

Turn over

12. Find the quartile co-efficient of skewness for the distribution having $Q_1 = 268.25$, $Q_2 = 279.06$ and $Q_3 = 290.75$.
13. A manufacturer of television tubes has two types of tubes, A and B. Respectively, the tubes have mean lifetimes of $X_A = 1495$ hours and $X_B = 1875$ hours, and standard deviations of $S_A = 280$ hours and
- Absolute dispersion.
 - Relative dispersion ?

(5 × 2 = 10 marks)

Section C

Answer any **three** out of **five** questions.

Each question carries 4 marks.

14. Table shows the IQs of 480 school children at a certain elementary school. Using the coding method, find (a) the mean ; (b) The standard deviation ; (c) Determine the percentage of the students IQs that fall within the ranges $\bar{X} \pm s$, and $\bar{X} \pm 2s$

Class mark (X)	...	70	74	78	82	86	90	94	98	102	106	110	114	118	122
Frequency (f)	...	4	9	16	28	45	66	85	72	54	38	27	18	11	5

15. In a company having 80 employees, 60 earn 10.00 rupees per hour and 20 earn 13.00 rupees per hour.
- Determine the mean earnings per hour.
 - Would the answer in part (a) be the same if the 60 employees earn a mean hourly wage of 10.00 rupees per hour ? Prove your answer.
 - Do you believe the mean hourly wage to be typical ?
16. Find the mean, median and mode for the sets.
- 3, 5, 2, 6, 5, 9, 5, 2, 8, 6.
 - 51.6, 48.7, 50.3, 49.5, 48.9.
17. Prove that the quadratic mean of two positive unequal numbers, a and b, is greater than their geometric mean.
18. Find the (a) first, (b) second, (c) third, and (d) fourth moments about the mean for the set of numbers 2, 3, 7, 8, 10.

(3 × 4 = 12 marks)

Section D

Answer any **two** out of **three** questions.

Each question carries 6 marks.

19. Two variables X and Y , assume the values $X_1 = 2, X_2 = -5, X_3 = 4, X_4 = -8$ and $Y_1 = -3, Y_2 = -8, Y_3 = 10, Y_4 = 6$, respectively. Calculate (a) $\sum X$, (b) $\sum Y$, (c) $\sum XY$, (d) $\sum X^2$, (e) $\sum Y^2$, (f) $(\sum X)(\sum Y)$, (g) $\sum(X + Y) \sum(X - Y)$.
20. Table shows a frequency distribution of the weekly wages of 65 employees at the PR Company. With reference to the table given, determine the standard deviation.

Wages Employees (in rupees)	Number of employees
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

21. Find Pearsons (a) first and (b) second coefficients of skewness for the wage distribution of the 65 employees at the PR Company given in the above problem.

(2 × 6 = 12 marks)