

D 51241-B

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Name.....

Reg. No.....

THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2018

(CUCBCSS—UG)

LRP Pattern

A11—BASIC NUMERICAL SKILLS

(2017 Admissions)

Time : Three Hours

Maximum : 80 Marks

Use of Scientific/ Basic Calculators and Mathematical/ Statistical tables are permitted.

Part A

This part consist of two bunches of questions.

Each bunch has five questions. Each question carries 1 mark.

Answer all the ten questions.

(A) Choose the best answer from the options given:

1 The sets of {MARCH} and {CHARM} are——— sets.

(a) Singleton set.

(b) Equal.

(c) Equivalent.

(d) None of these.

2 —— data are in the shape of raw material.

(a) Primary or secondary.

(b) Primary.

(c) Secondary.

(d) None.

3 An appropriate method for working out consumer price index is —— .

(a) Simple aggregate Expenditure method.

(b) Family budget method.

(c) Simple average relative method.

(d) None.

4 The measure of dispersion based on all the observations of the series is :

(a) Q.D.

(b) Range.

(c) S.D.

(d) All.

Turn over

5 One nth term of a G.P. is _____.

(a) arn .

(b) $arn - 1$.

(c) anr .

(d) $an - 1r$.

(B) Fill in the Blanks :

6 The value exactly at the middle of a class interval is _____.

7 A matrix with equal number of rows and columns is called _____ matrix.

8 When $Q_1 = 20, Q_3 = 30, QD =$ _____.

9 _____ index is known as the 'ideal' index.

10 One expression $b - 4ac$ is called _____ of the quadratic equation.

(10 × 1 = 10 marks)

Part B (Short Answer Questions)

Answer any **eight** questions.

Each question carries 2 marks.

11 If $a + b ; a - b = 5 : 2$; find the value of $b : a$.

12 2 shops have the stock of large, medium and small sizes of toothpaste. The number of each size stocked is given by the matrix 'A'; where :

$$A = \begin{array}{ccc} & \begin{array}{c} \text{Large} \\ \text{Medium} \\ \text{Small} \end{array} & \\ \begin{array}{c} \text{Shop No. I} \\ \text{Shop No. II} \end{array} & \begin{pmatrix} 150 & 240 & 120 \\ 90 & 300 & 210 \end{pmatrix} & \end{array}$$

The cost matrix, B of different size of the toothpaste is given by

$$B = \begin{array}{c} \begin{pmatrix} 14 \\ 10 \\ 6 \end{pmatrix} \\ \text{Large} \\ \text{Medium} \\ \text{Small} \end{array}$$

Compare the Investments in Toothpaste by each shop.

13 Find the mean of variables X and Y; given the following :

Regression of Y on X : $2Y - X - 50 = 0$

Regression of X on Y : $3Y - 2X - 10 = 0$

- 14 A cyclist pedals from his house to college at a speed of 8 Kms/hr. and back from the college to his house at 12 Kms/ hr. Find the Average Speed.
- 15 Represent $(A \cap B) \cup (A \cap C)$ by using a Venn diagram.
- 16 If the Arithmetic Mean of two observations is 25 and their Harmonic mean is 9, find their Geometric Mean.
- 17 Calculate the time in which a sum of money doubles at 10% per annum.
- 18 What is an Index Number ?
- 19 From the following data, calculate the Coefficient of Variation :
Karl Pearson's Coefficient of Skewness = 0.42 ; Arithmetic Mean = 86 and Median = 80.
- 20 The parabolic trend equation for the sales (in 1000s of Rs.) of a Company is given as $Y = 15.6 - 0.4 X + 0.9 X^2$ (Origin : 1995 : X Unit = 1 year ; Y Unit = Yearly Sales.) Shift the origin to 2000.

(8 × 2 = 16 marks)

Part C (Short Essay Questions)*Answer any six questions.**Each question carries 4 marks.*

- 21 Show that the value of the determinant :

$$\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix} = 0.$$

- 22 The first 4 moments of a distribution about $X=2$ are $-2, 12, -20$ and 100 . Calculate the moment about mean and β_2 . Show if the distribution is leptokurtic or platykurtic ?
- 23 Distinguish between primary and secondary data.
- 24 Solve $x^{10} - 33x^5 + 32 = 0$.

Turn over

25 The following frequency table presents the income in 100s earned by 57 families in a town and draw a Lorenz Curve :

Income	:	0-10	10-50	50-200	200-500	500-1000
No. of Families	:	22	78	124	24	9

26 An Index is 100 in 2001, it rises 4% in 2002 ; falls by 6% in 2003, falls 4% in 2004 ; and rises 3% in 2005. Calculate the Index Numbers for the five years with 2003 as base.

27 If Mean of a Normal Distribution is 45 and SD is 15. Find the values of Q_1 and Q_3 .

28 Shares of two companies have the following information :

	Mean of Share values	SD of Share values
Company A	15	5
Company B	20	8

Examine :

(i) Which Company's shares are better ? (2 marks)

(ii) Which Company's shares have greater variability ? (2 marks)

[6 × 4 = 24 marks]

Part D (Essay Questions)

Answer any two questions from three.

Each question carries 15 marks.

29 If α and β be the roots of the Quadratic equation ; $x^2 + mx + 12 = 0$ and $\alpha - \beta = 1$. Find the values of 'm', α and β .

30 What is Time Series Analysis ? What are its objectives ? Discuss its components in detail.

31 The daily expenditures of 100 families is given below :

Daily Expenditures	:	0-20	20-40	40-60	60-80	80-100
No. of families	:	13	?	27	?	16.

If the mode of the distribution is 44, then calculate the Karl Pearson's Coefficient of Skewness.

(2 × 15 = 30 marks)