

## 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 :

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

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

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

Compare the Investments in Toothpaste by each shop.

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

$$\text{Regression of Y on X : } 2Y - X - 50 = 0$$

$$\text{Regression of X on Y : } 3Y - 2X - 10 = 0$$

- 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  $\beta_2$ . 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  $\alpha$  and  $\beta$  be the roots of the Quadratic equation ;  $x^2 + mx + 12 = 0$  and  $\alpha - \beta = 1$ . Find the values of 'm',  $\alpha$  and  $\beta$ .
- 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)