D 51241-B (Pages : 4) 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 Ma

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.

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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 sixes of toothpaste. The number of each size stocked is given by the matrix 'A', where :

	Large	Medium	Small	
A =	150	240	120	Shop No. I
	90	300	210	Shop No. II

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

B =	14	Large
	10	Medium
	6	Small

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 : $3Y - 2X - 10 = 0$

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

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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)

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