M.Com. Semester—III (CGS) Examination
STATISTICAL ANALYSIS

Time : Three Hours]   [Maximum Marks : 80

Note :— (1) **All** questions are compulsory.

(2) The figures to the right indicates marks to the questions.

(3) Student may use alternate method if not specified.

SECTION—A
(Multiple Choice Questions)

Note :— Answer the following questions by choosing the correct option from those given below.

1.   Probable error is used for _____.

(A) Measuring the error in 'r'   (B) Measuring the error in 'p'

(C) Testing the significance of 'r'   (D) None of these

2.   If X – Y = 50, the correlation between X and Y will be _____.

(A) +1   (B) –1

(C) –0.50   (D) +0.25

3.   Regression equation is also known as _____.

(A) Prediction equation   (B) Line of average relationship

(C) Estimating equation   (D) All of these

4.   If ΣD^2 is zero, the coefficient of rank correlation will be _____.

(A) 1   (B) 0

(C) –1   (D) Both (B) and (C)

5.   Non Sampling error are _____.

(A) Error in response   (B) Faulty planning

(C) Error of Compilation   (D) All of these

6.   Paird t test is used when _____.

(A) Observation in the two samples are paired

(B) Observation in the two samples are independent

(C) Observation in the two samples are same

(D) Observation in the two samples are non relation

7. A part of population selected for study is called _____.

   (A) Parameter   (B) Sample

   (C) Statistics   (D) Data

8. The 'F' test was first developed by the _____.

   (A) Bowley   (B) Karl Pearson

   (C) Spearman   (D) R.A. Fisher

9. _____ is/are types of Index numbers.

   (A) Price Index Number   (B) Value Index Number

   (C) Quantity Index Number   (D) All of these

10. If the attributes A and B are independent the frequency (AB) is equal to _____.

    (A) $\dfrac{(A)}{(B)} \times N$ (B) $\dfrac{(A) \times (B)}{N}$

    (C) $N \times \dfrac{(A)}{(B)}$ (D) $\dfrac{(B) \times N}{(A)}$

11. Upper control limit of R Chart is given by _____.

    (A) D3R   (B) D2R

    (C) D4R   (D) D9R

12. Yule's coefficient of Association can be _____.

    (A) Can take any value between ±1   (B) Has no limit

    (C) Less than 1   (D) Greater than 1

13. In case of constistent data, no class frequency can be _____.

    (A) Positive   (B) Negative

    (C) Equal   (D) Both (A) and (C)

14. _____ Interpolation method is accurate and time consuming.

    (A) By Arithmetic method   (B) By Graphical method

    (C) By Square method   (D) By Estimation

15. What is the probability of getting an even number when a die is tossed ?

    (A) $\dfrac{1}{3}$ (B) $\dfrac{1}{2}$

    (C) $\dfrac{1}{6}$ (D) $\dfrac{1}{5}$

16. A time series consists of _____.

    (A) Long term changes   (B) Short term changes

    (C) Irregular variation   (D) All of these

17. A set of data depending on the time is called _____.

    (A) Quality control   (B) Time series

    (C) Survey   (D) Recorded information

18. The component useful for short term forecasting is _____.

    (A) Seasonal   (B) Irregular

    (C) Cyclical   (D) Trend

19. Symbolically $P_{01} \times P_{10} = 1$ stands for _____.

    (A) Unit test   (B) Circular test

    (C) Factor Reversal test   (D) Time Reversal Test

20. The trend is determined by _____.

    (A) The link relative method   (B) Ratio to trend method

    (C) Ratio to moving average method   (D) None of these   20×1=20

SECTION—B

1. (i) For the following data, calculate the coefficient of Rank Correlation :

X	80	91	99	71	61	81	70	59
Y	123	135	154	110	105	134	121	106

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(ii) Calculate the coefficient of concurrent for the following data :

Supply	65	40	35	75	63	80	35	20	80	60	50
Demand	60	55	50	56	30	70	40	35	80	75	80

    6

OR

The following calculation have been made for closing prices of ten (10) stocks (X) on the Bombay Stock Exchange on a certain day along with the volume of sales in thousands of shares (Y). From these calculations, find the regression equation of price of stock, on the volume of sales of shares :

$\Sigma x = 232$, $\Sigma y = 148$, $\Sigma xy = 4598$, $\Sigma x^2 = 16663$, $\Sigma y^2 = 6882$.   12

2. Two types of batteries X and Y are tested for their length of and the following results are obtained :

Battery	Sample Size	Mean (hr.)	Standard Deviation (hr)
X	100	1000	10
Y	120	1020	11

Can you conclude that the two types of batteries are having the same mean life ? 12

OR

Random samples are drawn from two populations and the following results were obtained :

Sample X : 16 17 18 19 20 21 22 24 26 27 – –

Sample Y : 19 22 23 25 26 28 29 30 31 32 35 36

Find out variance of the two populations and test whether the two samples have variance.

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3. In an industry 200 workers, employed for a specific job were classified according to their performance and training received/not received to test independence of a specific training and performance. The data summarised is as follows :

	Performance		
	Good	**Not Good**	**Total**
Trained	100	50	150
Untrained	20	30	15
Total	120	80	200

Use χ^2 test of independence at 5% level of significance and write your conclusion.

[Data from χ^2-table; χ^2 (1 d.f. 5% = 3.84)] 12

OR

Construct quantity index number for 2005 from the following data by using Fisher's Quantity Index :

Commodities	2003			2005		
	Price	**Quantity**	**Total Value**	**Price**	**Quantity**	**Total Value**
A	8	10	80	10	11	110
B	10	9	90	12	9	108
C	16	16	256	20	17	340

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4. (i) What is probability of 53 Sundays in a leap year ? 6

   (ii) Six dice are thrown 729 times. How many times do you expect at least 3 dice to show a five or six ? 6

OR

The following table gives the expectation of life (e_x^o) at age x. Calculate the expected life at age 12 by using Newton's methods :

X	10	15	20	25	30	35
e_x^o	35.4	32.2	29.1	26.1	23.1	20.4

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5. Explain the concept of Statistical Quality Control. Write the need and utility of Statistical Quality Control. 12

OR

Find the value of method of least squares from the following data :

Year	2011	2012	2013	2014	2015
Production	214	220	228	228	230

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