BACHELOR OF COMPUTER APPLICATIONS (BCA) (Revised)
Term-End Examination
June, 2022

BCS-040 : STATISTICAL TECHNIQUES

Time : 2 hours   *Maximum Marks : 50*

Note :

(i)   *Attempt both sections, i.e., Section A and Section B.*

(ii)   *Attempt any **four** questions from Section A.*

(iii)   *Attempt any **three** questions from Section B.*

(iv)   *Use of non-scientific calculator is allowed.*

SECTION A

1. A random sample of 50 students of mathematics taken from a total of 200, showed a mean of 75 and a standard deviation of 10. Find 95% confidence limits for mean. (Given Z = 1·96)   *5*

2. Calculate the mean and standard deviation from the following data :   *5*

Marks	No. of Students
0 – 10	10
10 – 20	9
20 – 30	25
30 – 40	30
40 – 50	16
50 – 60	10

3. In order to find the correlation coefficient between two variables X and Y from 20 pairs of observations, the following calculations were made :

$$\Sigma X = 15, \Sigma Y = +6, \Sigma XY = 50,$$
$$\Sigma X^2 = 61 \text{ and } \Sigma Y^2 = 90$$

Calculate the correlation coefficient and the slope of the regression line of Y on X. *5*

4. Differentiate between Simple Random Sampling and Systematic Random Sampling. *5*

5. List the advantages and disadvantages of using a sampling approach instead of a census approach for studying the characteristics of data. *5*

SECTION B

6. Describe the following tests in detail :   *10*

   (a) Time series and its components

   (b) Chi-square test for independence of attributes

7. (a) Compute the three yearly moving average of the following data :   *5*

Day	Sales
1	45
2	46
3	48
4	47
5	58
6	58
7	51
8	52
9	53
10	45
11	51
12	61

   (b) An automobile tyre manufacturing company claims that the average life of a particular grade of tyre is more than 20,000 km when used under normal driving conditions. A random sample of 16 tyres was tested and mean and standard deviation of 22,000 km and 5,000 km respectively were calculated. Assuming the life of the tyres in km to be normally distributed, decide whether the manufacturer's claim is true ? Use 5% level of significance. (Given $t_{0.05, 15} = 1.75$)   *5*

8. The following contingency table presents the analysis of 300 persons according to hair colour and eye colour :

Hair Colour	Eye Colour		
	Blue	Grey	Brown
Fair	30	10	40
Brown	40	20	40
Black	50	30	40

Test the hypothesis that there is an association between hair colour and eye colour at 5% level of significance. (Given that $\chi^2_{0.05,\,4} = 9.49$) *10*

9. A computer engineer identifies A, B and C as three methods to do a certain job. To determine how long the operator takes to do the job when each of these methods is used, the engineer asks four operators to do the job using the method A, another four operators to do the job using the method B, and so on. Each operator's time (in minutes) is shown below :

A	B	C
19	18	21
17	16	20
22	15	19
20	14	19

Construct the relevant analysis of variance table and test the hypothesis that the average time of all operators are equal at 5% level of significance. *10*
(Given that $F_{0.05,\,(2,\,9)} = 4.26$)