BCS-040

BACHELOR OF COMPUTER APPLICATIONS (BCA) (Revised)

□□5￢5　Term-End Examination

June, 2018

BCS-040 : STATISTICAL TECHNIQUES

Time : 2 hours　　　　　　　　　*Maximum Marks : 50*

Note :

(i)　Attempt both Section A and Section B.

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

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

SECTION A

1. Draw a histogram and a frequency polygon for the following data. Also find its mean. Further comment on the shape of the distribution.　　5

Time (in minutes)	No. of Machines
20 – 25	· 03
25 – 30	07
30 – 35	11
35 – 40	08
40 – 45	05
45 – 50	02

2. A sample of size 3 is to be selected from a population of 10 households. List all possible samples by (a) Linear systematic; (b) Circular systematic sampling. *5*

3. A bag contains 10 white and 3 black balls. Balls are drawn one by one without replacement till all the black balls are drawn. Find the probability that this procedure comes to an end at the 6th draw. *5*

4. From a list of 500 names and addresses, 100 names were selected without replacement and 25 wrong addresses were found. Identify the population and estimate the total number of addresses required to be corrected in the list. Also estimate the standard error. *5*

5. 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*

6. A random sample of size 10 from a normal population gives the values 64, 72, 65, 70, 68, 71, 65, 62, 66, 67. If it is known that the standard error of the sample mean is $\sqrt{0.64}$, find 95% confidence limits for the population mean. Also find the population variance. *5*

SECTION B

7. (a) The police plans to enforce speed limits by using radar traps at 4 different locations within the city limits. The radar traps at each of the locations L_1, L_2, L_3 and L_4 are operated 40%, 30%, 20% and 10% of the time respectively. If a person who is speeding on his way to work has probabilities 0·2, 0·1, 0·5 and 0·2 respectively, of passing through these locations, what is the probability that he will receive a speeding ticket ? Also find the probability that he will receive a speeding ticket at location L_1. 5

(b) Explain the exponential smoothing method. Use the same to forecast the following data. Also estimate the error. [Take W = 0·1]

Table : Number of new colleges opened in the country. 5

Year	Colleges
2001	5
2002	3
2003	3
2004	4
2005	3
2006	6
2007	4

8. The result of a survey regarding radio listeners' preference for all different types of music are given in the following table with listeners classified by age group :

Types of Music Preferred	Age Group		
	19 – 25	26 – 35	Above 35
National Music	60	60	30
Foreign Music	190	264	96
Indifferent	50	76	74

Test at 5% level of significance whether the type of music is dependent on the age group. Given that

$\chi^2_{4,5\%} = 9{\cdot}488.$ *10*

9. A company wants to test whether its 3 salesmen A, B and C have the same selling ability. Their records of sales (in ₹ '000) during various weeks of the last month are given below :

Salesman	A	B	C
I^{st} week	16	22	25
IInd week	20	20	24
IIIrd week	18	15	16
IVth week	25	26	20

Prepare a one-way ANOVA table and test the hypothesis that all the salesmen perform equally over the week. Given $F_{5\%}(2, 9) = 4{\cdot}26.$ *10*

10. Write short notes on any *four* of the following : $4 \times 2\frac{1}{2}=10$

   (a)   Cluster Sampling

   (b)   Stratified Sampling

   (c)   Control Charts

   (d)   Goodness of Fit

   (e)   Moving Average