No. of Printed Pages : 5

BCS-040

BACHELOR OF COMPUTER APPLICATIONS (BCA) (Revised)

05043 **Term-End Examination**

June, 2015

BCS-040 : STATISTICAL TECHNIQUES

Time : 2 hours *Maximum Marks : 50*

Note :

(i) Attempt both Sections, A and B.

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

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

SECTION A

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

$$\Sigma x = 15, \quad \Sigma y = -6, \quad \Sigma xy = 50$$

$$\Sigma x^2 = 61 \quad \text{and} \quad \Sigma y^2 = 90.$$

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

2. Suppose 2% of the items made in a factory are defective. Find the probability that there are

   (i) 3 defectives in a sample of 100,

   (ii) no defectives in a sample of 50. *5*

3. Telephone Directories have telephone numbers which are the combinations of the ten digits 0 to 9. The observer notes the frequency of occurrence of these digits and wants to test whether the digits occur with same frequency or not ($\alpha = 0{\cdot}05$). The data are given below : *5*

Digits	Frequency
0	99
1	100
2	82
3	65
4	50
5	77
6	88
7	57
8	82
9	30

(Given that χ^2_9 (0·05) = 16·918)

4. Fit a linear trend y = a + b * Demand, to the data collected in a unit manufacturing umbrellas, given in the following table : *5*

Month	1	2	3	4	5	6
Demand	46	56	54	43	57	56

5. The mean weekly sales of soap bars in different departmental stores was 146·3 bars per store. After an advertisement campaign the mean weekly sales of 22 stores for a typical week increased to 153·7 and showed a standard deviation of 17·2. Was the advertisement campaign successful at 5% level of significance ? (Given t_{21} (0·05) = 2·08) *5*

6. Write two merits and two demerits of Median.
An incomplete frequency distribution is given as follows :

C.I.	Frequency
10 – 20	12
20 – 30	30
30 – 40	?
40 – 50	65
50 – 60	?
60 – 70	25
70 – 80	18

Given that median value of 200 observations is 46, determine the missing frequencies using the median formula. *5*

SECTION B

7. A chemical firm wants to determine how four catalysts differ in yield. The firm runs the experiment in three of its plants, types A, B, C. In each plant, the yield is measured with each catalyst. The yield (in quintals) are as follows :

Plant	Catalyst			
	1	2	3	4
A	2	1	2	4
B	3	2	1	3
C	1	3	3	1

Perform an ANOVA and comment whether the yield due to a particular catalyst is significant or not at 5% level of significance. Given $F_{3,6} = 4{\cdot}76$. *10*

8. Find and plot the regression line of y on x on scatter diagram for the data given below : *10*

Speed km/hr	30	40	50	60
Stopping distance in feet	160	240	330	435

9. In an air pollution study, a random sample of 200 households was selected from each of 2 communities. The respondent in each house was asked whether or not anyone in the house was bothered by air pollution. The responses are tabulated below (Given χ_1^2 (0·05) = 3·841) :

Community	Yes	No	Total
I	43	157	200
II	81	119	200
Total	124	276	400

Can the researchers conclude that the 2 communities are bothered differently by air pollution ? (α = 0·05) *10*

10. 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 30% of the time. If a person who is speeding on his way to work has probabilities of 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 ? Find also the probability that he will receive a speeding ticket at locations L_1, L_2, L_3 and L_4. *10*