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BCS-040

BACHELOR OF COMPUTER APPLICATIONS (BCA) (REVISED)

Term-End Examination

December, 2020

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. Calculate the correlation coefficient and slope of the regression line Y on X, by using the data given below : 5

$$\Sigma x = 15$$

$$\Sigma y = -6$$

$$\Sigma xy = 50$$

$$\Sigma x^2 = 61$$

$$\Sigma y^2 = 90$$

Above data is calculated from 20 pairs of observations for variables X and Y.

2. Suppose A and B are two independent events, associated with a random experiment. If the probability of occurrence of either A or B is 0.6; while probability that only A occurs is 0.4, then determine the probability of occurrence of event B. 5

3. Suppose 2% of the items made in a factory are defective. Find the probability that there are : 5

   (i) 3 defectives in a sample of 100

   (ii) no defectives in a sample of 50

4. The mean weekly sales of chocolate packets in different departmental stores was 146.3 packets 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

5. Differentiate between the following : 5
   (i) Parametric and Non-Parametric tests
   (ii) Binomial distribution and Poisson's distribution

6. An incomplete frequency distribution is given below :

Class Interval	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. Using the regression line :

$$\hat{y} = 90 + 50x$$

fill up the values in the table below : 10

Sample No. (i)	12	21	15	1	24
x_i	0.96	1.28	1.65	1.84	2.35
y_i	138	160	178	190	210
$\hat{y}_i$	138	—	—	—	—
$e_i = y_i - \hat{y}_i$	0	—	—	—	—

After filling the table, compute the parameters R and R^2. Interpret the correlation between X and Y.

8. A chemical firm wants to determine how four catalysts (i.e. 1, 2, 3, 4) differ in their yields ? The firm conducted the experiment in three of its plants (i.e. A, B and C). In each plant, the

yield is measured with each catalyst. The yield (in quintals) is tabulated below : 10

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 $F_{3,6} = 4.76$.

9. What do you understand by the term 'Forecasting' ? How does forecasting differ from prediction ? Give suitable examples in support of your answer. Briefly discuss the forecasting models. 10

10. Telephone directories have telephone numbers which are the combinations of 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 ($\alpha = 0.05$). The data is tabulated below :

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

(Given that $\chi^2_{9\,(0.05)} = 16.918$). 10