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BCS-040

BACHELOR OF COMPUTER APPLICATIONS (BCA) (Revised)

Term-End Examination

June, 2021

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. An Automobile service centre performed the following number of car services each month :

15, 18, 25, 40, 25, 18, 25, 21, 30, 33, 25, 20, 10, 28, 36, 15, 26, 35, 20, 21, 32, 40, 32, 16, 12, 14, 22, 26, 37, 16.

(i) Construct a continuous frequency distribution of the above data by taking suitable class width.

(ii) Draw the histogram of constructed continuous frequency distribution in part (i). *5*

2. The information regarding production of wheat (in thousand kg) in 25 districts is collected for a particular season. Select a possible systematic random sample of 7 units from the data given below :

23, 20, 30, 37, 76, 36, 13, 36, 16, 58, 53, 83, 10, 15, 13, 17, 12, 16, 17, 21, 20, 18, 61, 31, 71.

Also calculate the sample mean from the selected units. *5*

3. A shopkeeper claims that the average life of a CFL Bulb is 1600 hours. To check this claim, a researcher takes a sample of 100 CFL bulbs of the same make randomly and finds mean lifetime of 1570 hours with standard deviation of 120 hours. Is the claim acceptable at 5% level of significance ? [Given that Z = ± 1·96] *5*

4. The incidence of occupational disease in an industry is such that the workers have a 20% chance of suffering from it. What is the probability that out of six workers

(i) Four or more will contract the disease ?

(ii) Three will contract the disease ? *5*

5. Differentiate between the following with one example of each :

(i) Assignable causes and Chance causes

(ii) Producer's risk and Consumer's risk *5*

6. Use moving average of length 3 for the data on sales given in following table :

Month	*Sales*
1	25
2	15
3	30
4	38
5	58
6	62
7	85
8	88
9	60
10	40
11	40
12	38

Calculate the moving average and plot it against the appropriate month. Also plot the data in the same graph. *5*

SECTION B

7. A researcher wishes to test whether a person's cholesterol level will change if the diet is changed. She takes a sample of 15 persons and divides them into 3 diet groups randomly. The data of cholesterol levels (in mg/deciliter) for the three groups are given below :

Cholesterol Levels		
Diet 1	*Diet 2*	*Diet 3*
190	210	170
170	200	200
210	230	210
180	210	200
200	190	205

Test whether the average effect of different diets on cholesterol level differs significantly at 5% level of significance.

[Given that $F_{(2, 12)}(0{\cdot}05) = 3{\cdot}885$] *10*

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*
Burgundy	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 $\chi^2_{4,\,0{\cdot}05} = 9{\cdot}48$] *10*

9. Determine a regression equation $y = a + bx$ for the data given in the table below :

x	y
1	2
1	3
2	5
3	6
4	8
4	8
5	9
6	10
6	9
7	11

Use fitted regression line to predict y when x = 8.

Draw a scatter diagram to represent the data. *10*

10. Write short notes on any ***two*** of the following : *5 ×2=10*

(i) Exponential Smoothing Method

(ii) Cluster Sampling

(iii) Correlation and Rank-correlation