BACHELOR OF COMPUTER APPLICATIONS (BCA) (REVISED)

Term-End Examination

December, 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. A pharmacologist measured the amount of dopamine (no. of moles/gm) in the brains of

each of 10 rats. The observed data is given below :

6.8, 7.0, 5.3, 6.0, 5.9, 5.6, 6.8, 7.4, 6.2, 7.0

Calculate :   5

(i) The mean and standard deviation

(ii) Coefficient of variation

2. In a certain population of women, 5% have breast cancer, 15% are smokers and 3% are smokers as well as have breast cancer. A woman is selected and random from the population. What is the probability that she has breast cancer or she is a smoker ?   5

3. The pulse rate of 6 people was recorded before and after taking a new drug, which are given below :

	Pulse Rate					
Before Drug	68	71	84	93	67	74
After Drug	71	70	82	97	73	80

On the basis of the above information, can you conclude that there is a significant effect of the

new drug to increase the pulse rate at 1% level of significance ?　　　　5

[Given that $t_{5(0.01)} = 4.032$]

4. A company produces electric bulbs. To estimate the average life of the bulbs, the quality inspector selects 80 bulbs randomly. She finds that the average life of these bulbs is 50 hours. Find the population average life of the electric bulbs produced by the company using 95% confidence limits.　　　　5

5. The average yield of wheat crop (in quintals/ha) pertaining to fields of 40 villages in a district is given below :

20, 21, 32, 41, 55, 22, 64, 42, 28, 35, 25, 25, 24, 32, 75, 28, 29, 38, 19, 19, 16, 28, 30, 29, 29, 19, 37, 34, 31, 35, 29, 19, 27, 42, 39, 11, 26, 21, 45, 61.

Select a systematic random sample of 10 units and find the average of it.　　　　5

6. The yearly water consumption in a small city for ten years is given below. Determine the trend values by using a 3-yearly moving average. Also plot the values and interpret the results :　　　　5

Year	Water consumption (in thousand gallon)
2007	26
2008	27
2009	28
2010	30
2011	29
2012	27
2013	30
2014	31
2015	32
2016	31

Section—B

7. Twenty individuals were randomly assigned to four different production processes. Production of units per hour for the four processes are given below :

Process I	33	30	28	29	30
Process II	33	35	30	38	34
Process III	28	38	30	34	30
Process IV	34	28	29	26	28

Determine if there is significant difference in the average production units per hour for the four types of production processes. [Given that $F_{(3,16)(5\%)} = 3.24$]. 10

8. A population of size 10000 is divided into 4 strata. Their sizes and standard deviations are given below :

	Strata			
	I	II	III	IV
N_i = Sizes	5000	1000	2000	2000
s_i	25	10	15	20

A stratified random sample of size 500 is to be drawn from this population. Determine the sizes of samples from these strata, in case :   10

(i)   Proportional allocation is used

(ii) Neyman's optimum allocation is used.

9. 1000 students at college level were graded according to their IQ levels and the economic condition of their parents, as follows :

Economic Condition	IQ Level		
	High	Low	Total
Rich	230	170	400
Poor	470	130	600
Total	700	300	1000

Test the hypothesis that IQ levels are independent of the economic conditions at 1% level of significance.

[Given that $\chi^2_{1(0.01)} = 6.63$]   10

10. A gynecologist recorded the blood pressure (BP) of her patients and collected the following data :

Age (in years)	BP (in mmHg)
23	65
24	60
25	62
26	70
28	70
29	73
31	75
35	83
40	90

Fit the regression line for the given data and estimate BP if age of the patient is 38 years.   10