

BACHELOR OF COMPUTER APPLICATIONS**(BCA) (Revised)****Term-End Examination, 2019****BCS-040 : STATISTICAL TECHNIQUES****Time : Two Hours]****[Maximum Marks : 50**

Note : Attempt both sections, i.e., Section A and Section B. Attempt **any four** questions from **Section-A**. Attempt **any three** questions from **Sections-B**. Non-scientific calculator is allowed.

SECTION - A

1. The following table represent daily wages (in rupees) of the workers in a certain commercial organisation : [5]

Daily Wages	200-300	300-400	400-500	500-600
Number of Workers	05	10	03	02

Calculate mean and standard deviation of the above data.

2. A person is known to hit a target in 4 out of 5 shots whereas another person is known to hit in 2 out of 3 shots. Find the probability that the target being hit, when they both try. [5]
3. An oil exploration firm plans to drill four holes. It is assumed that the probability of oil yield from each hole is $1/5$. Since the holes are in quite different locations, the outcome of drilling one holes is statistically independent of that of drilling any other holes. What is the probability that two or more holes produce oil. [5]
4. A population of five households having monthly income (in thousand rupees) as following :

Household	1	2	3	4	5
Income	14	10	12	20	18

Write all possible samples without replacement of size 2 and show that sample mean gives an unbiased estimate of population mean.

5. Explain **any two** of the following : [5]
- (a) z-test for mean
- (b) Paired t-test

- (c) Simple random sampling

SECTION - B

6. An investigator is interested to know the level of knowledge about the history of India, among three different schools in a city. A test is given to four students of 8th class of each school. Their scores out of 10 are given below :

School I	School II	School III
8	6	6
6	4	5
7	6	5
5	5	6

Test the equality of the average scores of the three schools at 5% level of significance. [10]

(Given $F_{(2,9)} 5\% = 4.26$)

7. A Manager of a car company wants to estimate the relationship between age of cars and annual maintenance cost. The following data from six cars of same model are obtained as :

Age of Car (in years)	Annual Maintenance Cost (In hundred rupees)
1	10
2	15
3	18
4	20
5	25
6	35

- (a) Construct a scatter diagram for the data given above.
- (b) Fit a best linear regression line, by considering annual maintenance cost as the dependent variable and the age of the car as the independent variable.
- (c) Use this regression line to predict the annual maintenance cost for the car of age 8 years.

[2+7+1]

8. The following contingency table presents the analysis of 300 persons according to hair colour and eye colour :

Hair Colour	Eye Colour			Total
	Blue	Grey	Brown	
Fair	30	10	40	80
Brown	40	20	40	100
Black	50	30	40	120
Total	120	60	120	300

Test the hypothesis that there is an association between hair colour and eye colour at 1% level of significance

(Given $\chi^2_{(4), 1\%} = 13.28$, $\chi^2_{(6), 1\%} = 16.81$) [10]

9. (a) Define stratified random sampling.
- (b) Suppose the population of three towns is $N_1 = 50000$, $N_2 = 30000$, and $N_3 = 40000$, respectively. A stratified random sample is to be drawn with a total sample size of $n = 500$. Determine the sample size for each town individually using the method of :
- proportional allocation
 - Optimal allocation.

It is known from a previous survey that $S_1 = 30$, $S_2 = 15$ and $S_3 = 20$

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