

## Instructions:

- All questions are compulsory.
- Write answer of each section in separate answer books.
- Figures to the right indicate marks of questions.
- Standard notations are used.

## Section I

- Q-1 (A) The following table given the number of units produced per day by two workers A and B for a number of days: [07]

|   |    |    |    |    |    |    |    |    |
|---|----|----|----|----|----|----|----|----|
| A | 40 | 30 | 38 | 41 | 38 | 35 | -  | -  |
| B | 39 | 38 | 41 | 33 | 32 | 49 | 49 | 34 |

Should these results be accepted as evidence that B is the more stable worker? Use F test at 5% level and critical value is 3.11.

- (B) A simple random sampling survey in respect of monthly earning of semi-skilled workers in two cities gives the following statistical information: [05]

| City | Mean monthly earning (Rs) | Standard deviation of sample data of monthly earning | Size of sample |
|------|---------------------------|--|----------------|
| A    | 695                       | 40   | 200            |
| B    | 710                       | 60   | 175            |

Test the hypothesis at 5% level that there is no difference between monthly earning of workers in two cities. (Use  $Z_{tab} = 1.96$ )

## OR

- Q-1 (A) Two sample are drawn from two normal population from the following data test whether the two sample have the same variance. F- Test and critical value is 3.68. [07]

|          |    |    |    |    |    |    |    |    |    |    |
|----------|----|----|----|----|----|----|----|----|----|----|
| Sample A | 71 | 65 | 71 | 80 | 80 | 82 | 89 | 87 | -  | -  |
| Sample B | 56 | 66 | 69 | 80 | 78 | 56 | 85 | 45 | 88 | 91 |

- (B) An auto company decided to introduce new six cylinder car whose mean petrol consumption is claimed to be lower than that of the existing auto engine. It was found that the mean petrol consumption for 50 cars was 10KM per liter with a standard deviation of 3.5 KM per liter test for the company at 5% level of significance, whether the claim the new car petrol consumption is 9.5 KM per liter on average is acceptable. (Use  $Z_{tab} = 1.96$ ) [05]

- Q-2 (A) From the data given below about the treatment of 250 patients suffering from a disease state whether the new treatment is superior to the conventional treatment  $\chi_{tab}^2 = 3.84$  [07]

| Treatment    | No. of patients |               |       |
|--------------|-----------------|---------------|-------|
|              | Favorable       | Not favorable | total |
| New          | 140             | 30            | 170   |
| Conventional | 60              | 20            | 80    |
| total        | 200             | 50            | 250   |

- (B) Explain the flow diagram of hypothesis testing. [04]

## OR

- Q-2 (A) Calculate the karl perason's coefficient of correlation between X and Y: [07]

|   |   |    |    |    |    |    |
|---|---|----|----|----|----|----|
| X | 1 | 3  | 5  | 7  | 8  | 10 |
| Y | 8 | 12 | 15 | 17 | 18 | 20 |

(B) A die is thrown 132 times with following results:

[04]

Is the die unbiased?  $\chi_{tab}^2 = 11.071$

| Number turned up | 1  | 2  | 3  | 4  | 5  | 6  |
|------------------|----|----|----|----|----|----|
| frequency        | 16 | 20 | 25 | 14 | 29 | 28 |

Q-3 (A) Explain measurement of dispersion in detail.

[06]

(B) Raju restaurant near the railway station at falna has been having average sales of 500 tea cups per day. Because of the development of bus stand nearby, it expects to increase its sales. During the first five days after the starts of the bus stand, the daily sales were as under: 550,570,490,615,505,580,570,460,600,580,530,526. On the basis of this sample information, can one conclude that Raju restaurant's sales have increased? Use 5% level of significance. (Use  $Z_{tab} = 1.96$ )

[06]

### Section II

Q-4 (A) Give the criteria for good research.

[06]

(B) Explain the block diagram of research process.

[06]

OR

Q-4 (A) Elaborate the different points that must be considered while selecting a research problem.

[06]

(B) Explain in detail the Applied and Fundamental types of research.

[06]

Q-5 (A) What are the steps of sample design and illustrate it.

[06]

(B) Explain non-probability sampling.

[05]

OR

Q-5 (A) Define the following terms related to a research design.

[06]

- 1) Dependent and Independent variable
- 2) Extraneous variable
- 3) Confounded relationship
- 4) Research hypothesis
- 5) Experimental unit
- 6) Control

(B) What are the methods of probability sampling and explain stratified sampling.

[05]

Q-6 (A) Explain the interview method for data collections.

[06]

(B) Explain measurement scales.

[06]

END OF PAPER