

CBCS SCHEME

USN

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18PLN1.5

First Semester B. Planning Degree Examination, June/July 2019 Quantitative Methods for Planners

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain Scatter diagram method. (06 Marks)
- b. Find correlation coefficient from the following data: (14 Marks)

| Companies | A | B | C | D | E | F | G |
|--------------------|---|---|---|---|---|---|---|
| Rank by agency – 1 | 2 | 5 | 7 | 4 | 3 | 2 | 1 |
| Rank by agency – 2 | 1 | 3 | 4 | 7 | 6 | 5 | 2 |
| Rank by agency – 3 | 2 | 4 | 3 | 6 | 7 | 4 | 1 |

OR

- 2 a. Differentiate correlation and regression. (06 Marks)
- b. The following data shows budget amount for advertisement and sales of ABC company:

| | | | | | | | | |
|--------------------------------------------|----|----|----|----|----|----|----|----|
| Budget amount for advertisement in (lakhs) | 20 | 18 | 25 | 30 | 27 | 32 | 27 | 30 |
| Sales in Crore | 12 | 15 | 17 | 15 | 18 | 19 | 22 | 20 |

What is the estimate of sales when advertising budget amount is Rs.48L? (14 Marks)

Module-2

- 3 a. Explain steps in testing of hypothesis. (08 Marks)
- b. The average life of apartment constructed by ABC builders is 55 years with standard deviation of 3 years. A sample of 32 apartments is examined showed average life of 58 years. Test the hypothesis that life of apartment is 55 years at 1% loss [Table value = $K = 2.58$]. (12 Marks)

OR

- 4 a. 288 respondents out of 300 were supported for railway under pass project near diary circle in satellite town. Test the claim that proportion of the supporters for the railway underpass project is more than 50% at 1% loss. [Table value $K = 2.33$ at 1% loss]. (10 Marks)
- b. Explain role of level of significance and statistical significance in testing procedure. (10 Marks)

Module-3

- 5 a. Define Chi-square distribution and mention its properties. (06 Marks)
- b. The following data shows number of absentees in a construction company:

| Days | MON | TUE | WED | THU | FRI | SAT |
|---------------|-----|-----|-----|-----|-----|-----|
| Life in years | 15 | 16 | 16 | 15 | 18 | 20 |

Test the hypothesis that absentees is uniformly distributed over the week working days at 5% loss [Table value $K = 11.1$]. (14 Marks)

Subtraction Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. $42+8=50$, will be treated as malpractice.

OR

- 6 a. Discuss the importance of ANOVA in testing procedure. (06 Marks)
 b. The following data shows number of flats marketed by 5 developers in 4 cities:

| Developers | CITY-A | CITY-B | CITY-C | CITY-D |
|------------|--------|--------|--------|--------|
| A | 16 | 17 | 15 | 17 |
| B | 17 | - | 16 | 15 |
| C | - | 18 | 16 | 16 |
| D | 17 | 19 | 17 | 16 |
| E | 18 | 17 | 16 | 18 |

Test the hypothesis that number of flats marketed by developers as well as in all cities is same. [Table value $K_1 = 5.85$ and $K_2 = 8.70$]. (14 Marks)

Module-4

- 7 a. Define Operation Research. Explain the methods of solving or models. (10 Marks)
 b. Obtain the minimum transportation cost using least count method: (10 Marks)

| Depot → Refinery ↓ | A | B | C | D | Available |
|-----------------------|-----|------|------|------|-----------|
| P | 100 | 120 | 150 | 80 | 1300 |
| Q | 110 | 110 | 90 | 100 | 1500 |
| R | 200 | 90 | 70 | 180 | 1700 |
| Required | 900 | 1000 | 1400 | 1200 | |

OR

- 8 a. Solve the LPP graphically,
 $\text{Min } Z = 45x_1 + 35x_2$; $4x_1 + 3x_2 \geq 100$ and $SC = 2x_1 + 3x_2 \geq 60$; $x_1 \geq 0, x_2 \geq 0$ (10 Marks)
 b. A civil engineer has to visit 5 cities for survey the wishes to start from a particular city, visit each city once and then return to his starting point. Cost of going from one city to another is shown below. Find the least cost route and minimum cost, (10 Marks)

| To cities → From cities ↓ | A | B | C | D | E |
|------------------------------|----------|----------|----------|----------|----------|
| A | ∞ | 14 | 17 | 13 | 14 |
| B | 14 | ∞ | 16 | 13 | 14 |
| C | 17 | 16 | ∞ | 17 | 15 |
| D | 13 | 13 | 17 | ∞ | 17 |
| E | 14 | 14 | 15 | 17 | ∞ |

Module-5

- 9 a. Explain decision making under risk. (10 Marks)
 b. ABC company wants to sell its product in a city by settling up office in a city or through agents. Office settling up with cost of Rs.8L with 53% success, if this succeeds company gets a profit of Rs.25L per year. If this fails company either close office or rent this office for an annual cost of Rs.8.6L and probability of getting rent is 42%.
 If company sells through agents company gets Rs.5L initial cost with chances of 45% which yields annual profit of 15.5 lakhs per year.
 i) Draw decision tree ii) Suggest the best decision. (10 Marks)

OR

- 10 a. Explain decision making under uncertainty. (10 Marks)
 b. State the best decision using EMV and EVPI approach. (10 Marks)

| States of Nature/Decision | A ₁ | A ₂ | A ₃ | A ₄ |
|---------------------------|----------------|----------------|----------------|----------------|
| S ₁ | 30 | 20 | 36 | 35 |
| S ₂ | 35 | 30 | 26 | 29 |
| S ₃ | 30 | 24 | 22 | 32 |
| S ₄ | 35 | 28 | 31 | 19 |
| Probability | 0.26 | 0.3 | 0.3 | 0.4 |

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