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D.K.M.COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1

**SEMESTER EXAMINATIONS**

**APRIL - 2017 15CCO4D**

**ELECTIVE II: BUSINESS STATISTICS AND OPERATION RESEARCH - II**

Time : 3 Hrs Max.Marks : 75

SECTION-A (10 x 2 =20)

**Answer ALL the questions.**

1. What is Positive Correlation?
2. What is Rank Correlation?
3. Define ‘Index Number’?
4. What is Cost of Living Index?
5. Define ‘Time Series’.
6. List out any two utility of Time Series Analysis.
7. Find the probability of getting a total of more than 15 in one throw with 3 dice.
8. Three light bulbs are chosen at random from 15 bulbs of which 5 are defectives. Find the probability that none is defective.
9. What is Optimal Solution?
10. What is Assignment Problem?

SECTION-B (5 x 5 =25)

**Answer any FIVE of the following questions.**

1. Calculate the correlation coefficient between height (in inches) and weight (in kg) from the data given below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Height | 60 | 63 | 65 | 64 | 68 |
| Weight | 50 | 53 | 60 | 67 | 70 |

1. Calculate the regression equation from the following data.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| X | 6 | 2 | 40 | 4 | 8 |
| Y | 9 | 11 | 5 | 8 | 7 |

1. Construct the cost of living index number from the table given below.

|  |  |  |  |
| --- | --- | --- | --- |
| S. No | Group | Index for 1985 | Expenditure |
| 1. | Food | 1100 | 46% |
| 2. | Clothing | 430 | 10% |
| 3. | Fuel and Lighting | 440 | 7% |
| 4. | House Rent | 300 | 12% |
| 5. | Miscellaneous | 550 | 25% |

1. Fit a straight line trend through the method of least squares for the following data.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 |
| Sales | 110 | 115 | 130 | 140 | 145 | 160 | 180 |

1. Write short note on “Baye’s Theorem”.
2. Write the various steps for Solving an “Assignment Problem”.
3. Find an initial basic feasible solution using North – West Corner Rule.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | X | Y | Z |  |
| A | 8 | 7 | 3 | 60 |
| B | 3 | 8 | 9 | 70 |
| C | 11 | 3 | 5 | 80 |
|  | 50 | 80 | 80 | 210 |

1. Calculate suitable index number of the following data.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Commodities | A | B | C | D | E |
| Base year price | 32 | 41 | 53 | 64 | 17 |
| Base year quantity | 07 | 05 | 06 | 03 | 08 |
| Current year price | 43 | 57 | 63 | 82 | 19 |

SECTION-C (3 x 10 =30)

**Answer ALL the questions.**

1. (a) The I.Q’s of a group of 6 persons were measured, and they then sat for a certain examination.

Their I.Q’s and examination marks were as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Persons | A | B | C | D | E | F |
| I.Q | 110 | 100 | 140 | 120 | 80 | 90 |
| Exam marks | 70 | 60 | 80 | 60 | 10 | 20 |

Compute the rank correlation coefficient.

(Or)

(b) You are given below the following information about advertising and sales.

|  |  |  |
| --- | --- | --- |
|  | Adv. Exp (X)  (Rs. Lakhs) | Sales (y)  (Rs. Lakhs) |
| Mean | 10 | 90 |
| S.D. | 3 | 12 |

Correlation coefficient =0.8

1. Obtain the two regression lines.
2. Find the likely sales when advertisement expenditure is Rs.15 lakhs.
3. What should be advertisement expenditure if the company wants to attain sales target of Rs. 120 lakhs?
4. (a) Calculate Fisher’s Ideal Index from the following data and prove that it satisfies both the time

reversal and factor reversal tests.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Commodities | 2002 | | 2003 | |
| Price | Qty | Price | Qty |
| A | 08 | 16 | 10 | 16 |
| B | 10 | 20 | 12 | 24 |
| C | 06 | 12 | 08 | 14 |
| D | 16 | 10 | 20 | 08 |

(Or)

(b) Using three year moving averages determine the trend and short – term fluctuations.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 1988 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 |
| Production in tones | 21 | 22 | 23 | 25 | 24 | 22 | 25 | 26 | 27 | 26 |

1. (a) Explain the Addition and Multiplication Theorem on Probability.

(Or)

(b) Four jobs can be processed on four different machines, one job on one machine. Resulting

profits vary with assignments. They are given below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Machines | | | |
|  |  | A | B | C | D |
| Jobs | I | 42 | 35 | 28 | 21 |
| II | 30 | 25 | 20 | 15 |
| III | 30 | 25 | 20 | 15 |
| IV | 24 | 20 | 16 | 12 |

**\* \* \* \* \* \* \***