Quantitative Methods - II

24/04/2017

(140)

Q.P. Code :05941

[Time: : $2\frac{1}{2}$ Hours]

[Marks:75]

Please check whether you have got the right question paper.

N.B: 1.   All questions are compulsory Subject to internal choice.

2.   Figures to right indicate full marks.

Q.1 A Fill in the blanks choosing the correct alternatives (any eight)   08

1.   If we reject H_0 when H_0 is actually true, then we are committing ---------error-
     a)   Type I
     b)   Type II
     c)   Neither
     d)   Both

2.   When there are more than 2 decision variables in a LPP then we need to use the------ method to solve it.
     a)   Simplex
     b)   Complex
     c)   Duplex
     d)   All the three

3.   A matrix of order 1 X n is called a ---- matrix.
     a)   Row
     b)   Column
     c)   Unit
     d)   Square

4.   The inverse ratio of 2:3 is
     a)   3:2
     b)   1:6
     c)   6:1
     d)   None of these

5.   Return is the profit earned on---- invested in the business
     a)   Capital
     b)   Risk
     c)   Both
     d)   None of these

6.   The difference between the merchandise exports and imports is called -------
     a)   Trade deficit
     b)   Trade profit
     c)   Trade revenue
     d)   Trade balance

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7. Infrastructure facilities consist of
    a) Railways
    b) Inflation
    c) Income
    d) Real income

8. A matrix is said to be null matrix if all the elements of the matrix are ------
    a) Ones
    b) Zeros
    c) Two
    d) Three

9. In simplex method the intersecting element of key row and key column is known as----- element
    a) Key
    b) Non – key
    c) Initial
    d) None of these

10. In the process of testing, a statistician starts with a hypothesis called -------- - hypothesis
    a) Alternate
    b) Level of significance
    c) Null
    d) None of these

B State whether the following statements are True or False (any seven)   07
    1) A hypothesis stating that there is no significant difference between the statistic calculated from the sample and the population parameter assumed is called the null hypothesis.
    2) Linear programming forms the basic foundation for an important branch of Mathematics and Statistics called Operational Research.
    3) If the determinant of a square matrix is 1, then the matrix is a identity matrix.
    4) If a: b = 2:3 and b: c = 2:3 then a: b: c: is 4:6:9.
    5) The expected return is calculated from the mean deviation of the returns.
    6) The sum of borrowings (internal and external) and other liabilities and the budgetary deficit is called as Fiscal deficit.
    7) GDP growth rate is the least important economic indicator.
    8) Business risk is a type of systematic risk.
    9) Constraints are the restrictions on the use of limited resources.
    10) Test of statistic is used to decide whether to accept or reject H_0.

Q.2   a. Solve the LPP graphically   07
        $Minimize\ z = 12x_1 + 20x_2$
        Subject to $x_1 + x_2 \geq 7$
                $5x_1 + 2x_2 \geq 20$
                $x_1, x_2 \geq 0$

    b. A coin is tossed 400 times and was found to result in head 245 times. Can we conclude that the coin   08
       is fair? Use 5% level of significance.

OR

c. Solve the following using simplex method   10
   Maximize $z = 9x_1 + 13x_2$
   $2x_1 + 3x_2 \leq 18$
   $2x_1 + x_2 \leq 0$
   $x_1, x_2 \geq 0$

d. Vitamins A and B are found in foods F_1 and F_2. One unit of food F_1 contains 3 units of vitamin A and   05
   4 units of Vitamin B. One unit of food F_2 contains 6 units of Vitamin A and 3 units of vitamin B. One
   unit of food F_1 and F_2 and cost Rs.4 and Rs.5 respectively. The minimum daily requirement for a
   person of vitamins A and B is 80 and 100 units respectively. Assuming that anything in excess of the
   daily minimum requirements of the Vitamins is not harmful; formulate the LPP to calculate the
   optimum mixture of foods F_1 and F_2 at the minimum cost which meets the daily requirements of the
   two vitamins.

Q.3

a. Find the inverse of the matrix A = $\begin{bmatrix} 2 & 3 & 1 \\ 2 & 4 & 1 \\ 3 & 7 & 2 \end{bmatrix}$ 07

b. A, B and C started a business with a total capital of Rs. 3,00,000. At the end of the year, the profits   08
   received by A, B and C were Rs. 10,000 , Rs.25,000 and Rs 15,000 respectively. Find the amounts of
   capital invested by A,B and C.

OR

c. Abhigyan purchases 3 pens, 2 bags and 1 instrument box and pays Rs. 41 form the same shop. Ishaan
   purchases 2 pens, 1 bags and 2 instrument boxes and pays Rs. 29, while shruti purchases 2 pens,
   2bags and 2 instrument boxes and pay Rs.44. Translate the problem into a system of equations. Solve   10
   the system of equations by matrix method and hence find the cost of one pen, one bag and one
   instrument box.

d. By selling an article at Rs.3,000 a person earned 20% profit. What would have been the percentage   05
   profit or loss, if he had sold it at Rs. 2,750?

Q.4 a. Given is the probability distribution of return of two stocks. Find the correlation coefficient   07

Economic conditions	Probability	Return of stock A (%)	Return of stock B (%)
A	0.4	30	40
B	0.5	25	30
C	0.1	-20	- 15

b. From the following information calculate beta of security   08

Year	Return on Security (%)	Return on market portfolio (%)
1	10	12
2	12	11
3	15	14
4	10	12
5	8	11

OR

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c. Given below are the likely returns in case of shares of VCC Ltd. And LCC Ltd in the various economic conditions. Both the shares are presently quoted at Rs.100 per share.   10

Economic conditions	Probability	Returns of VCC Ltd.	Returns of LCC Ltd.
High growth	0.3	100	150
Low growth	0.4	110	130
Stagnation	0.2	120	90
Recession	0.1	140	60

    1) Which of the two companies are risky investment?
    2) Mr. Suresh has two options for investing Rs.1000
        I. Only in shares of VCC Ltd.
        II. Only in shares of LCC Ltd.

d. The probability distributions of annual returns on a security are given below. Compute the expected return on the security.   05

Return on security	Probability
-0.35	0.04
-0.25	0.08
-0.15	0.14
-0.05	0.17
0.05	0.26
0.15	0.18
0.25	0.09
0.35	0.04

Q.5   a. Define GDP, GNP, NDP and NNP. Explain briefly electricity generation in infrastructure.   10
     b. Explain level of significance, null hypothesis and Alternate Hypothesis.   05

OR

Attempt any three questions.   15
     c. Explain in short the different measures of money supply, giving their formulae.
     d. What are Type I and Type II errors? Explain briefly.
     e. Explain the following with examples.
         I. Transpose of a matrix
         II. Singular matrix
     f. What are the different types of risk? Explain.
     g. Explain duality in linear programming with an example .