



K-2552

First Year B. Com. (Honours) (Sem. II) Examination
October/November – 2012
Mathematics & Statistics : Paper - II

Time : Hours]

[Total Marks :

Instructions :

(1)

नीचे दृशावेव निशानीवाणी विगतो उत्तरवही पर अवश्य लपवी.
Fillup strictly the details of signs on your answer book.

Name of the Examination :
F. Y. B. COM. (HONOURS) (SEM. 2)

Name of the Subject :
MATHEMATICS & STATISTICS - 2

Subject Code No. : 2 5 5 2 Section No. (1, 2,.....): Nil

Seat No. :

Student's Signature

(2) Answer all the questions.

(3) Figures to the right indicate full marks of the question.

- 1 (a) Explain the terms : 4
- (1) Constraints
- (2) Basic solution
- (3) Basic feasible solution.
- (b) Solve the following LPP by graphical method 6

$$\text{Minimize } Z = 10x + 5y$$

Subject to the constraints

$$3x + 5y \leq 150$$

$$5x + 4y \geq 100$$

$$0 \leq x \leq 30$$

$$0 \leq y \leq 15$$

$$x, y \geq 0$$

- (c) Solve the following assignment problem : 4

| | Machines | | | |
|-------------|----------|----------|----------|----------|
| <i>Jobs</i> | <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> |
| J_1 | 12 | 15 | 18 | 08 |
| J_2 | 13 | 10 | 09 | 14 |
| J_3 | 10 | 12 | 15 | 13 |
| J_4 | 07 | 08 | 09 | 14 |

- 2 (a) Solve the following LPP by Simplex method 6

Maximize $Z = 3x_1 + 5x_2$

Subject to the constraints :

$$3x_1 + 2x_2 \leq 18$$

$$x_1 \leq 4$$

$$x_2 \leq 6$$

$$x_1, x_2 \geq 0$$

- (b) Explain Hungarian method for solving assignment problems. 4
- (c) Find an initial basic feasible solution by using Max (Min-Max) method : 4

Destinations

| <i>Origins</i> | D_1 | D_2 | D_3 | D_4 | <i>Supply</i> |
|----------------|-------|-------|-------|-------|---------------|
| O_1 | 23 | 27 | 16 | 18 | 30 |
| O_2 | 12 | 17 | 20 | 51 | 40 |
| O_3 | 22 | 28 | 12 | 32 | 53 |
| <i>Demand</i> | 22 | 35 | 25 | 41 | 123 |

- 3 (a) Explain : 6
 (i) Future value
 (ii) Present value.
- (b) Rs. 5,000 is invested in a Term deposit scheme that 4
 fetches interest 6% per annum compounded quarterly.
 What will be the interest after one year ? What is
 effective rate of interest ?
- (c) Find the present value of Rs. 10,000 to be required 4
 after 5 years if the interest rate be 9%.
- 4 (a) A firm can produce three types of cloth say A, B and 6
 C. Three kinds of wool are required for it, say, red wool,
 green wool and blue wool. One unit length of type A
 cloth needs 2 yards of red wool and 3 yards of blue wool;
 one unit length of type B cloth needs 3 yards of red wool,
 2 yards of green wool and 2 yards of blue wool; one unit
 length of type C cloth needs 5 yards of green wool and
 4 yards of blue wool. The firm has only a stock of 8 yards
 of red wool, 10 yards of green wool and 15 yards of blue
 wool. It is assumed that the income obtained from one
 unit length of type A cloth is Rs. 3, of type B cloth is
 Rs. 5 and of type C cloth is Rs. 4 formulate the problem
 as linear programming model so as to maximize the
 total income from finished cloth.
- (b) Obtain Initial Basic Feasible solution for the 4
 following transportation problem by Vogel's
 Approximation method :

| | <i>I</i> | <i>II</i> | <i>III</i> | <i>IV</i> | q_i |
|----------|----------|-----------|------------|-----------|-------|
| <i>A</i> | 15 | 10 | 17 | 18 | 2 |
| <i>B</i> | 16 | 13 | 12 | 13 | 6 |
| <i>C</i> | 12 | 17 | 20 | 11 | 7 |
| b_j | 3 | 3 | 4 | 5 | |

- (c) Four different jobs can be done on four different machines. The below matrix gives the cost in rupees of producing job on each machine : 4

Machines

| Workers | M_1 | M_2 | M_3 | M_4 |
|---------|-------|-------|-------|-------|
| W_1 | 5 | 7 | 11 | 6 |
| W_2 | 8 | 5 | 9 | 6 |
| W_3 | 4 | 7 | 10 | 7 |
| W_4 | 10 | 4 | 8 | 3 |

Assign jobs so as to minimize total assignment cost.

- 5 (a) Explain conversion period. An amount of Rs. 1500 is deposited in a bank paying an annual interest rate of 4.3% compounded quarterly. Find the balance after 6 years. 6
- (b) Determine the present value of an annuity if the amount of each payment is Rs. 2000 payable at the end of each year for 4 years and the interest rate is 6% compounded annually. 4
- (c) Rs. 16000 is invested at 10% per annum compounded semiannually amounts to Rs. 18522. Find the time period of investment. 4
