* U A - 2 5 5 2 *

UA-2552

First Year B. Com. (Honours) (Sem. II) Examination

March/April – 2012

Mathematics & Statistics - II

Time : **3** Hours] [Total Marks : **70**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **FIRST YEAR 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) Attempt **all** the questions.

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

1 (a) Give mathematical formulation of linear programming problems. State its uses. **4**

(b) Solve the following LPP graphically **6**

Maximize $Z = 20x_1 + 10x_2$

Subject to constraints :

$$3x_1 + x_2 \geq 30$$

$$x_1 + 2x_2 \leq 40$$

$$4x_1 + 3x_2 \geq 60$$

$$x_1,\ x_2 \geq 0$$

(c) From the following data, assign the jobs to the machines, which minimizes the total cost : **4**

Machines / Jobs	I	II	III	IV
A	0	7	14	21
B	12	17	22	27
C	12	17	22	27
D	18	22	26	30

2 (a) Solve the following LPP by Simplex Method **6**

Maximize $Z = 3x_1 + 2x_2$

Subject to the constraints :

$$2x_1 + x_2 \leq 40$$

$$x_1 + x_2 \leq 24$$

$$2x_1 + 3x_2 \leq 60$$

$$x_1 , x_2 \geq 0$$

(b) Obtain the feasible solution of the following transportation problem by Min (Min-Max) method. **4**

		Destinations				
		D_1	D_2	D_3	D_4	Supply
Origins	O_1	20	18	22	13	10
	O_2	10	20	17	24	9
	O_3	19	17	18	12	11
	Demand	10	7	8	5	

(c) Obtain the dual problem of the following Linear Programming Problem. **4**

Maximize $f(x) = 2x_1 + 5x_2 + 6x_3$

Subject to the constraints :

$$5x_1 + 6x_2 - x_3 \leq 3$$

$$-2x_1 + x_2 + 4x_3 \leq 4$$

$$x_1 - 5x_2 + 3x_3 \leq 1$$

$$-3x_1 - 3x_2 + 7x_3 \leq 6$$

$$x_1 , x_2 , x_3 \geq 0$$

3 (a) Define : **6**

(i) Interest

(ii) Accumulated Amount

(iii) Compound Interest

(b) Krunal deposited some amount in a bank for $7\frac{1}{2}$ years at the rate of 6% per annum simple interest. Krunal received Rs. 1,01,500 at the end of the term. Compute initial deposit of Krunal. **4**

(c) A sum of Rs. 46,875 was lent out at simple interest and at the end of 1 year 8 months the total amount was Rs. 50,000. Find the rate of interest per annum. **4**

4 (a) Explain Vogel's method for finding the solution of a transportation problem. Also find initial basic feasible solution for the following transportation problem using Vogel's method : **8**

		Warehouse				
		W_1	W_2	W_3	W_4	Supply
Factory	F_1	19	30	50	10	7
	F_2	70	30	40	60	9
	F_3	49	8	70	20	18
	Demand	5	8	7	14	

(b) A firm manufactures two types of products A and B and sells them at a profit of Rs. 2 on type A and Rs. 3 on type B. Each product is processed on two machines G and H. Type A requires one minute on G and two minutes on H; Type B requires one minute on G and one minute on H. The machine G is available for not more than 6 hours 40 min. While machine H is available for 10 hours during any working day. Formulate the problem as linear programming problem. **6**

5 (a) The difference between simple and compound interests compounded annually on a certain amount of money for 2 years at 4% per annum is Re. 1. Find that amount. **5**

(b) In how many years will a sum be double of itself at 10% per annum simple interest. **4**

(c) Rs. 5,887 is divided between Shyam and Ram such that Shyam's share at the end of a year is equal to Ram's share at the end of 11 years, compounded annually at the rate of 5%. Find the share of Shyam. **5**
