* A C - 2 6 5 4 *

AC-2654

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

March/April – 2015

Mathematics & Statistics : Paper - II

Time : **2** Hours] [Total Marks : **50**

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. (Hons.) (Sem. II)**

Name of the Subject :

☛ **Mathematics & Statistics : Paper - II**

☛ Subject Code No. : **2 6 5 4** ☛ Section No. (1, 2,.....) : **NIL**

Seat No. :

Student's Signature

(2) All the questions are compulsory.

(3) Statistical tables and graph papers would be supplied on request.

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

1 (a) Explain: Non-negativity, Extreme Points and feasible solution. **3**

(b) Obtain the dual of the following primal linear programming problem. **3**

Maximize $Z = x_1 - 2x_2 + 3x_3$

Subject to $-2x_1 + x_2 + 3x_3 = 2$, $2x_1 + 3x_2 + 4x_3 = 1$, $x_1, x_2, x_3 \geq 0$

(c) A manufacturer of hair shampoo is preparing a production run for product A (for dry hair) and B (for oily hair). There are sufficient ingredients on hand for 60,000 bottles for each shampoo but there are only 60000 bottles into which either shampoo can be filled up. It takes 4 hours to to prepare enough shampoo to fill up 1,000 bottles of shampoo A and 3 hours to prepare enough shampoo to fill up 1000 bottles of shampoo. There are 200 hours available for preparation. Profit is Rs.9 for shampoo A and Rs.7 for shampoo B. How should production be scheduled to maximize the total profit. Use graphical method. **6**

2 (a) Maximize $Z = 5x_1 + 7x_2$ **6**

Subject to $x_1 + x_2 \leq 4, 3x_1 - 8x_2 \leq 24, 10x_1 + 7x_2 \leq 35, \ x_1 \geq 0, x_2 \geq 0$

Use Simplex method to solve this linear programming problem.

(b) A company has four plants. It provides the goods to three distributors. The demand, supply and the transportation cost is given below. The production cost per unit in all the four plants are respectively Rs. 40, 30, 30 and 50. Obtain the total transportation cost by Vogel's approximation method. **5**

Plant	D_1	D_2	D_3	Supply
P_1	19	15	30	6
P_2	14	16	25	10
P_3	23	12	16	12
P_4	11	21	39	15
Demand	11	13	19	

(c) Obtain total transportation cost by matrix minima method. **2**

Origin	D_1	D_2	D_3	Supply
O_1	3	7	6	6
O_2	2	8	1	4
Demand	7	5	3	

3 (a) A company has four salesmen. They are given four different areas. The yearly sales of each area is given below : **5**

Area :	A	B	C	D
Yearly Sales :	600	500	400	300

The sales capacity of the four salesmen are in the proportion of 8 : 6 : 6 : 5. Give the assignment to maximize the sales.

(b) Explain: Annuity, future value, present value. **3**

(c) Mr X purchased a Nano motor car for Rs.1,50,000 on installment basis. Beginning from the date of purchase, he had to pay 10 equal yearly installments inclusive of interest at the rate of 8% p.a. compound interest. Find out of the sum of an yearly installment. **4**

4 (a) Explain: Effective Rate of interest. Explain the problems relating to sinking fund. **3**

(b) Miss Y invested Rs.16,000 at 10% p.a. compounded semi-annually. It becomes Rs.18,522. Then obtain the time period of investment. **3**

(c) A machine costs Rs.5,20,000 with an estimated life of 25 years. A sinking fund is created to replace it by a new model at 25% higher cost after 25 years with a scrap value realization of Rs.25,000. What amount should set aside every year if the sinking fund investments accumulate at 3.5% compound interest p.a. ? **4**

(d) An investor intends purchasing a three year Rs.1,000 at per value bond having nominal interest rate of 10%. At what prize the bond may be purchased now, if it matures at par and the investor requires a rate of return of 14% ? **3**
