Roll No. .....

(05/16-I)

5022

B. Com. (Gen./Voc.) EXAMINATION

(2011 & 2012 Only)

(Second Semester)

BUSINESS MATH II

BC-202

Time : Three Hours *Maximum Marks :* 80

Note : Attempt *Five* questions in all. Q. No. **1** is compulsory. Students can demand graph papers maximum upto three.

1. (a) Find the solution set of the following system of linear constraints graphically :

$$3x + 4y \geq 6$$

$$5x + 8y \leq 20$$

$$x \geq 0, y \geq 0$$ 2

(b) Find the compound interest (payable yearly) on ₹ 2,400 for 2 years at 4% per year. 2

(c) Find the effective rate of interest of 10% p.a. payable half yearly. 2

(d) Draw the graph of the equation : 2

$$3x + 2y \leq 6$$

(e) Define the following terms : 2

(i) Feasible region

(ii) Optimal solution.

(f) The difference between compound interest and simple interest on a certain sum of money for 2 years at 4% is Rs. 20. Find the sum. 2

(g) Find the dual problem of the following L.P.P. :

Minimize $Z = 3x_1 + 5x_2$

Subject to the constraints

$$3x_1 + 2x_2 \geq 6$$
$$4x_1 + x_2 \geq 4$$
$$14x_1 + 6x_2 \geq 5$$
$$x_1 \geq 0, x_2 \geq 0$$ 2

(h) Find the compound interest on ₹ 24,000 at 15% p.a. for $2\frac{1}{3}$ years. 2

2. (a) Seema borrowed from Kamal a certain sum for two years at simple interest. Seema lent this to Hamid at the same rate for two years compounded interest. At the end of two years she received ₹ 110 as compound interest but paid ₹ 100 as simple interest. Find the sum and rate of interest. 8

(b) A machine depreciates at the rate of 10% of its value at the beginning of an year. The machine was purchased for ₹ 10,000 and the scrap value realized when sold was ₹ 3,855. Find how many years the machine was used for ? 8

3. (a) Find the difference between compound interests on ₹ 8,000 for $1\frac{1}{2}$ years at 10% p.a. when compounded annually and semi-annually. 8

(b) A new car is purchased for ₹ 4,00,000. Its value depreciates at the rate of 10% p.a. What will be its value after 4 years ? 8

4. (a) Find the present value of an annuity due of ₹ 1,000 per annum for 14 years allowing interest at 9% p.a. 8

(b) Find the present value of annuity due of ₹ 1,000 per annum for 14 years allowing interest at 9% p.a. 8

5. (a) Find the amount of an annuity due of ₹ 400 per year payable half yearly for 20 years to 4% per annum. 8

(b) ₹ 5,000 are deposited every year in an account earning 4% p.a. interest compounded continuously. Find the amount of the annuity for 10 years. 8

6. Solve the following L.P.P. by graphical method :

Maximize $Z = 6x + 11y$,

Subject to constraints

$$2x + y \leq 104$$
$$x + 2y \leq 76$$
$$x, y \geq 0$$ 16

7. Solve the following L.P.P. by graphical method :

Minimize $W = x - 7y + 190$,

Subject to constraints

$$x + y \leq 8$$
$$x + y \geq 4$$
$$x \leq 5$$
$$y \leq 5$$
$$x, y \geq 0$$ 16

8. An Oil company has two depots, A and B, with capacities of 7000 litres and 4000 litres respectively. The company is to supply oil to three petrol pumps D, E and F whose requirements are 4500 litres, 3000 litres and 3500 litres respectively. The distance (in km) between the depots and petrol pumps are given in table : 16

From / To	Distance (in km) A	B
D	7	3
E	6	4
F	3	2

Assuming that the transportation cost per km is ₹ 1 per litre, how should the delivery be scheduled in order that the transportation cost is minimum ?

9. Solve the following L.P.P by using simplex method :

Minimize $Z = 4x + 5y$,

Subject to the constraints :

$$2x + 3y \leq 12$$

$$2x + y \leq 8$$

$$x, y \geq 0$$

16