

11. There are seven jobs, each of which has to go through the machines 'A' and 'B' in the order AB. Processing times in hours are given below :

Job	1	2	3	4	5	6	7
Machine A	3	12	15	6	10	11	9
Machines B	8	10	10	6	12	1	3

Determine a sequences of those jobs that will minimize the total elapsed time. Calculate the total elapsed time & idle time for both the machines.

12. Discuss in brief 'duality' in linear programming & formulate the dual of the following primal LP problem

$$\text{Min } z = 7x_1 + 3x_2 + 8x_3$$

Subject to

$$8x_1 + 2x_2 + x_3 \geq 3$$

$$3x_1 + 6x_2 + 4x_3 \geq 4$$

$$4x_1 + x_2 + 5x_3 \leq 1$$

and  $x_1, x_2, x_3 \geq 0$

13. What is a 'modal' ? Write the characteristics of a good modal & explain five useful modals of O.R. in management.

## DG-451

### M.B.A. (F.T.) II<sup>nd</sup> Semester Examination, 2014

#### Management Science

#### Paper -CP-202

Time : 3 Hours]

[Maximum Marks : 80

#### Section - 'A'

Note :- Attempt four question. Each question carries 8 makrs.

1. Explain the basic steps of CPM and PERT.
2. Solve the following assignment problem to minimize the cost

		WORKERS		
		X	Y	Z
JOBS	A	11	16	21
	B	20	13	17
	C	12	13	17

(2)

DG-451

3. Define linear programming with an example in marketing management.
4. Explain the advantages of operations research approach.
5. Define the following :-
  - (i) Dummy activity in CPM Network.
  - (ii) Unbalanced transportation problem.
6. For the following game determine the saddle point, the associated pure strategies and the value of the game

		Player 'B'			
		B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	B <sub>4</sub>
Player 'A'	A <sub>1</sub>	0	-4	-5	6
	A <sub>2</sub>	-3	-4	-9	-2
	A <sub>3</sub>	6	0	-8	-9
	A <sub>4</sub>	7	3	-6	5

7. Solve the following LPP by graphical method

$$\text{Max : } z = 2x_1 + 3x_2$$

Subject to :

$$x_1 + 5x_2 \leq 15$$

$$2x_1 + x_2 \leq 10$$

$$x_1, x_2 \geq 0$$

(3)

DG-451

8. What do you understand by 'decision making under risk'. How is it different from 'decision making under uncertainty' ? Explain.

### SECTION - 'B'

**Note :-** Attempt any **three** question. Each question carries 16 marks.

9. A wholeselling company has three warehouses from which supplies are drawn for three retail customers. The table below gives the transportation costs per unit shipped from each warehouse to each customer

		Customer			Supply
		C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	
Warehouse	W <sub>1</sub>	5	6	2	100
	W <sub>2</sub>	3	7	5	50
	W <sub>3</sub>	8	5	7	200

Demand → 150 125 75

- Determine what supplies to dispatch from each warehouse to each customer so as to minimize total transportation cost.
10. Explain the methodology of operation research. Also state the limitations of operations research.

**P.T.O.**