Roll No. | | | | | | | | | | |

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2013

MECHANICAL ENGINEERING

Semester- VIII

26

ME9027 MANAGEMENT SCIENCES

(Regulation 2008)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Define the term operation research and state the three main phases in operations research.
2. What is sensitivity analysis?
3. What do you understand by a transportation problem?
4. Differentiate between CPM and PERT.
5. What are the evils of excess inventory?
6. Name the elements of an inventory control system.
7. What are the three important characteristics of a queue system?
8. What is 'pure strategy' in Game Theory?
9. What is saddle point and state the conditions when this is possible.
10. State the steps involved in Monte Carlo simulation.

PART- B (5X16 = 80 Marks)

11. (a) Prakash is a General Manager of a high-tech company. He has to develop on the optimal mix of two possible blending processes. The input and the output per production runs are as given below:

Process	Input		Output	
	Crude -1	Crude - 2	Gasoline- X	Gasoline -Y
1	6	3	6	9
2	5	6	5	5

The maximum availability of crude A and crude B are 250 units and 200 units respectively. The market requirement shows that atleast 150 units of gasoline X and 130 units of gasoline Y must be produced. The profits per production run from process 1 and 2 are Rs.40 and Rs. 50 respectively.

Formulate the problem for maximizing the profit. (8)

11(b) State the advantages and disadvantages of linear programming, (8)

12. (a) (i) State the assumptions made in assignment models. (8)

12. (a) (ii) A company is faced with the problem of assigning five jobs to five machines. Each job must be done on only one machine. The cost of processing each job on each machine is given below (in Rs.)

		Machines				
		M1	**M2**	**M3**	**M4**	**M5**
Jobs	**J1**	7	5	9	8	11
	J2	9	12	7	11	10
	J3	8	5	4	6	9
	J4	7	3	6	9	5
	J5	4	6	7	5	11

Determine the assignment of jobs to machines so that it will result in minimum cost. (8)

OR

12.(b) A company has three manufacturing plants **P1, P2** and **P3** and two markets **M1** and **M2.** Production cost per unit of a product at the plants **P1, P2** and **P3** are Rs.100, Rs.110 and Rs.120 respectively. Selling price of the product in markets **M1** and **M2** are Rs 300 and Rs 350 resoectively.Demand for the products in market M1 and M2 are 3000 and 3500 respectively. Production capacity of plant **P1, P2,** and **P3** are 2000, 3000, and 4000 respectively. Transportation costs are as follows:

From	**To**	
	M1	**M2**
P1	100	150
P2	150	200
P3	150	180

Build a mathematical model for this transportation problem. (16)

13.(a) A salesman has to visdit five cities A,B,C,D and E. He wishes to start from a particular city , visit a each city only once and then return to starting city. The cost of travelling from a city to another city is given in the Table below:

	City				
From \ To	A	B	C	D	E
A	0	12	15	17	11
B	16	0	13	18	12
C	18	17	0	14	17
D	21	14	18	0	16
E	11	13	12	18	0

Determine the least cost route. (16)

OR

13.(b) How can Gantt charts be used in project management . Explain with suitable examples. (16)

14.(a) The following discount pricing schedule is offered by a supplier to the customer.

Quantity	Unit & Price
1-49	Rs. 140
50-89	Rs. 110
90 plus	Rs. 90

The annual carrying cost for the item is Rs 200, the ordering cost is Rs. 250 per order and the annual demand is estimated to be 2000 units. The supplier wants to determine whether he should take advantage of this discount or order the EOQ order size. (16)

OR

14.(b) Discuss the differences between fixed- order quantity system and the fixed- time period system of inventory. (16)

15.(a).(i) Solve the following game

	Player B				
	Strategy	**B1**	**B2**	**B3**	**B4**
Player A	**A1**	20	15	12	30
	A2	25	10	8	12
	A3	40	5	10	5
	A4	-5	4	10	0

What strategy will the two players adopt? Also determine the value of the game. (8)

15.(a)(ii). What are the factors to be considered for replacement decisions? (8)

OR

15.(b)(i). Name the different types of failures. Explain any two in detail with examples. (16)

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