OR

Two competitors A and B are competing for the same product. Their different strategies are given in the following payoff matrix:

Company B

		I	II	III	IV
	I	3	2	4	0
Company A	II	3	4	2	4
	III	4	2	4	0
	IV	0	4	0	8

Use dominance principle to find the optimal strategies.

5. a) Define the heuristic and meta-heuristic algorithms.

   b) What is a non-linear problem?

   c) Indicate the difference between decision-making under risk and uncertainty in statistical decision theory.

   d) How will you carry out consistency check in an AHP? Take an example and calculate inconsistency ratio.

OR

What is traveling salesman problem? How will you solve it? Take suitable example to support your answer.

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Roll No ....

ME - 705

B.E. VII Semester

Examination, December 2015

Operations Research and Supply Chain

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

  ii) All parts of each question are to be attempted at one place.

  iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.

  iv) Except numericals, Derivation, Design and Drawing etc.

1. a) What are the essential characteristics of a linear programming model?

   b) Define slack and surplus variables as involved in the L.P.P.

   c) A firm manufactures two products A and B on which the profits earned per unit are Rs 3 and Rs 4 respectively. Each product is processed on two machines M_1 and M_2. Product A requires one minute of processing time on M_1 and two minutes on M_2, while B requires one minute on M_1 and one minute on M_2. Machine M_1 is available for not more than 7 hours 30 minutes while machine M_2 is available for 10 hours during any working day. Find the number of units of products A and B to be manufactured to get maximum profit.

d) Find the optimal assignment for the assignment problem with the following cost matrix.

	M_1	M_2	M_3	M_4
J_1	15	13	14	17
J_2	11	12	15	13
J_3	13	12	10	11
J_4	15	17	14	16

OR

Find the initial basic feasible solution of the following transportation problem by Vogel's approximation method.

		W_1	W_2	W_3	W_4	Capacity
	F_1	19	30	50	10	7
Factory	F_2	70	30	40	60	9
	F_3	40	8	70	20	18
Requirement		5	8	7	14	34(Total)

2. a) Define the supply chain management. What are the important drivers of the supply chain management?

b) Explain the role of information technology in supply chain management.

c) Describe the push/ pull and cycle views of supply chain processes with suitable example.

d) Explain briefly the efficient and responsive supply chain and describe the impact of demand uncertainty on the supply chain.

OR

Discuss the impact of Bull-whip effect and outline how it leads to increased risk and poor service level. Comment on remedies to mitigate the impact of this phenomenon.

3. a) What is inventory control? Explain its importance in an industrial undertaking.

b) What is "Just-in time" production? What are its aims?

c) Explain ABC analysis used in inventory control.

d) What are the objectives and benefits of MRP? Discuss different inputs and outputs of MRP.

OR

A particular item has a demand of 9000 units/ year. The cost of one procurement is Rs 100 and the holding cost per unit is Rs 2.40 per year. The replacement is instantaneous and no shortages are allowed. Determine

i) The economic lot size.

ii) The number of orders per year

iii) The time between orders

iv) The total cost per year if the cost of one unit is Rs.1

4. a) What do you understand by a queue? Give some important applications of queuing theory.

b) Define saddle point and the value of game with examples.

c) Explain Maximum-Minimum and Minimum-Maximum principle used in Game theory.

d) A person repairing radios finds that the time spent on the radio sets has been exponential distribution with mean 20 minutes. If the radios are repaired in the order in which they come in and their arrival is approximately Poisson with an average rate of 15 for 8-hour day, what is the repairman's expected idle time each day? How many jobs are ahead of the averages set just brought in?