Roll No .....

ME-7003 (CBGS)

B.E. VII Semester

Examination, November 2018

Choice Based Grading System (CBGS)

OR and Supply Chain

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.

1. a) A leather manufacturing company produces two types of belts A and B for which respective profits are Rs.8 and Rs.6. Each belt of type A requires twice as much time as belt of type B and if all belts were of type B, the company could produce 1000 belts per day. Supply of leather is sufficient only for 800 belts (both A and B combined). Belt A needs a fancy buckle and only 400 such buckles are available per day. Belt B requires another kind of buckle and only 700 such buckles are available per day. Formulate the problem as L.P.P. and determine the number of both the belts to be produced to maximize profit. 7

b) Solve the following linear programming problem by simplex method and VERIFY the results obtained by graphical method: https://www.rgpvonline.com 7

Maximize $Z = 40x_1 + 35x_2$

Subject to,

$$2x_1 + 3x_2 \leq 60$$
$$4x_1 + 3x_2 \leq 96$$
$$x_1, x_2 \geq 0$$

2. a) Consider the following problem where unit transportation costs are given in Indian Rupees: 7

		Destinations J	K	L	M	Availability
Factories	A	5	3	7	2	40
	B	6	4	2	8	70
	C	3	1	5	7	50
Requirements		75	20	50	30	

Due to shortage problems, some requirements may not be fulfilled. In such case, unfulfilled requirements may be levied penalties of Rs.2, Rs.5, Rs.3 and Rs.4 for the destinations J, K, L and M respectively. Determine the optimal allocation to minimize the transportation and penalty costs.

b) "Assignment Technique is a special case of Transportation Technique". Comment on this statement giving suitable example. Also enlist the industrial and non-industrial areas of application where assignment technique is used. 7

3. a) Discuss precisely the following in context with globalized issues in SCM: 7
   i) Effect of flow of material, money and information on SCM. https://www.rgpvonline.com
   ii) Effect of outsourcing and online system (e-marketing) on SCM.

b) Arrival rate of phone calls according to Poisson distribution with an average of 9 minutes between two consecutive calls. The lengths of telephone calls are assumed to be exponentially distributed with a mean 3 minutes per call. Determine: 7
   i) Probability that a customer has to wait.
   ii) Average lengths of the queue and the system.
   iii) Average waiting time in the queue and in the system.
   iv) Average non-empty queue (formed time to time) length.
   v) Probability of 'no' customer in the system.
   vi) Probability of exactly 4 customers in the system.
   vii) Probability of queue length being equal or more than 4.

4. a) A manufacturing unit has to produce 750 units per week. The cost per unit is Rs.50. Inventory holding cost is estimated at 10% of average inventory investment. Set-up cost per run is Rs.125. Shortage is not allowed. Determine: 7

   i) Economic Lot size.

   ii) Optimum number of setup runs.

   iii) Average annual minimum inventory cost.

   iv) Optimum period of production per setup run.

   b) What are the various types of inventory analysis and control techniques? Enlist all of them and precisely explain. 7

5. a) Explain the role of decision making analysis in a business organization and also describe the steps involved in it. 7

   b) Give short notes on the following: 7

   i) Hurwicz criterion for decision making under uncertainty. https://www.rgpvonline.com

   ii) Applications of Heuristic and Meta-Heuristic algorithms.

6. a) What is MRP? Explain MRP system and its functions giving suitable flow diagram. How this MRP is different from MRP-II? 7

   b) Reduce the following game by Rule of Dominance and determine the game value and optimal strategies for both the players A and B: 7

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		Player B						
		I	II	III	IV	V	VI	VII
Player A	1	2	2	0	2	1	1	2
	2	3	4	1	3	2	2	3
	3	2	3	1	3	2	0	3
	4	3	4	7	–5	1	2	–5
	5	1	2	7	–5	1	1	–2
	6	3	4	4	–1	2	2	0
	7	3	3	3	–2	2	2	1

7. a) Discuss development of MRP to ERP system and SCM. 7

   b) Discuss coordination and leadership issues in SCM process. 7

8. a) Define the following terminologies: 7

   i) Just-in-Time (JIT) https://www.rgpvonline.com

   ii) Saddle point in a game

   iii) Pure and mixed strategy in a game

   iv) Degeneracy in transportation problem

   v) Multiple server model in queuing system

   vi) Bull-whip effect in SCM system

   vii) Lead time variance and safety stock in inventory management.

   b) Solve the following travelling salesman problem and obtain its optimum solution. 7

	A	B	C	D	E
A	-	2	5	7	1
B	6	-	3	8	2
C	8	7	-	4	7
D	12	4	6	-	5
E	1	3	2	8	-

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