Roll No. ☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ME) (O.E. 2012 Onwards)   (Sem.–7)
# OPERATION RESEARCH
Subject Code : IT-310
M.Code : 72221

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. **Answer briefly :**

   a) Mathematics of OR is the mathematics of optimization. Discuss briefly.

   b) Distinguish between transportation and assignment model.

   c) Briefly explain integral programming concept.

   d) Explain the necessity of sensitivity analysis.

   e) How is PERT useful?

   f) What is the significance of dual variables?

   g) Briefly describe the role 'Theory of games' for scientific decision making.

   h) Explain the basic concept of a queue.

   i) List methods of solving linear goal programming problems.

   j) Write advantages of simulation.

SECTION-B

2. Seed Ltd . has two products Rice & Wheat. To produce one unit of Rice, 2 units of material X and 4 units of material Y are required. To produce one unit of Wheat, 3 units of material X and 2 units of material Y are required. At least 16 units of each material must be used in order to meet the committed sales of Rice & Wheat. Due to moderate marketing facilities not more than 8 units of product Wheat can be sold. Cost per unit of material X and Y are Rs.2.50 per unit and Rs.0.25 per unit respectively. The selling price per unit of Rice and Wheat are Rs.12 and Rs.16 respectively. Formulate LPP model.

3. "*Model-building is the essence of Operations Research approach*". Discuss.

4. Describe method of solving a zero-sum-two person game as linear programming problem.

5. With respect to queue system, explain the following terms :

   a) Queue discipline

   b) Capacity of the system

   c) Balking

   d) Jockeying

   e) queue length

6. Describe **any one** method of integral programming.

SECTION-C

7. a) State dual theorem and its implications. What is the essential difference between regular simplex method and dual simplex method?

   b) Prove that the dual of a given primal is again primal.

8. In a grocery store, the daily demand of bread over 100 days period has the following frequency distribution :

Daily Demand	0	1	2	3	4	5
No. of Days	5	25	35	20	5	10

   Using the above data, simulate a 10 day sequence of the demand of bread. Consider the following sequence of ten random numbers : 27,13,80,10,54,60,49,78, 66 and 44

9. A project has the following activities :

Activity-	A	B	C	D	E	F	G	H	I
Immediate predecessors	--	--	--	A	A	B	C	D	E, F
Activity Duration (Days)	7.8	20	33	18	20	9	9.8	8	4

   Determine the following :

   a) Draw the network and find Earliest start time, Earliest finish time, Latest start time and Latest finish time for each activity.

   b) The critical path and total project duration.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.