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Total No. of Pages :02

Total No. of Questions :09

B.Tech.(ECE) (2011 Batch Elective-III)(Sem.-7,8)**B.Tech.(ETE) (2011 Onwards Elective-III)****OPERATION RESEARCH****Subject Code : BTEC-918****M.Code : 71923****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. Write briefly :**

- (a) Define key row and degeneracy in simplex method.
- (b) Write the limitations of Graphical Model.
- (c) What do you understand by Unbalanced transportation problem?
- (d) Write two assumptions made in sequencing problems.
- (e) What is saddle point?
- (f) What are the two limitations of game theory?
- (g) Name the different methods used to solve transportation problem.
- (h) Write some applications of dynamic programming.
- (i) What are assumptions made in LP?
- (j) Name any four mathematical models.

SECTION-B

2. Differentiate between the Big M-Method and Two-Phase method.
3. What are the characteristics of dynamic programming?
4. Use the simplex method to solve the maximization problem:

$$Z=2X_1 +5 X_2$$

subject to: $X_1 +4X_2 \leq 24$;

$$3X_1+X_2 \leq 21$$
;

$$X_1+ X_2 \leq 9$$
;

$$X_1, X_2 \geq 0$$

5. What are the advantages of game theory?
6. Discuss the various phases of OR problem.

SECTION-C

7. A Machine operator has to perform three operations: turning, threading and knurling on a number of different jobs. The time required to perform these operations (in minutes) for each job is known. Determine the order in which the jobs should be processed in order to minimize the total time required to turn out all jobs. Also find the idle times for e three operations

Job	Time for turning	Time for threading	Time for knurling
1	3	8	13
2	12	6	14
3	5	4	9
4	2	6	12
5	9	3	8
6	11	1	13

8. Solve the assignment problem.

	1	2	3	4	5
A	11	17	8	16	20
B	9	7	12	6	15
C	13	16	15	12	16
D	21	24	17	28	26
E	14	10	12	11	13

9. Explain the MODI method in the context of transportation problem.

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.