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

Total No. of Questions : 18

B.Tech.(CSE) (O.E. 2012 to 2017) (Sem.–6)

OPERATION RESEARCH

Subject Code : IT-310

M.Code : 71554

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

Explain the following :

1. Artificial Variable
2. Initial Feasible solution
3. Unbalanced transportation problem
4. Least cost method
5. Minimum spanning tree problem
6. Relation between dual and primal
7. Dummy event
8. Payoff matrix
9. Mathematical formulation of the LPP
10. Saddle point

SECTION-B

11. Use Big M method to solve : Maximize $Z = x + y$ subject to constraints : $2x + y \geq 4$, $x + 7y \geq 7$, $x \geq 0$, $y \geq 0$.

12. Write differences between PERT and CPM.

13. Solve the travelling salesman problem so as to minimize the cost per cycle $C_{12} = 20$, $C_{13} = 4$, $C_{14} = 10$, $C_{23} = 5$, $C_{34} = 6$, $C_{25} = 10$, $C_{35} = 6$, $C_{45} = 20$, where $C_{ij} = C_{ji}$ and there is no route between cities if a value C_{ij} is not shown.

14. Consider a transportation Problem with m = 3 and n = 4 where.

    $C_{11} = 2$, $C_{12} = 3$, $C_{13} = 11$, $C_{14} = 7$, $C_{21} = 1$, $C_{22} = 0$, $C_{23} = 6$, $C_{24} = 1$, $C_{31} = 5$, $C_{32} = 8$, $C_{33} = 15$, $C_{34} = 9$ Suppose $S_1 = 6$, $S_2 = 1$, $S_3 = 10$, whereas $D_1 = 7$, $D_2 = 5$, $D_3 = 3$, $D_4 = 2$. Use Least cost method to find its solution.

15. State and prove Maximin-Minimax Principle for the selection of the optimal strategies by the two players, with example.

SECTION-C

16. Use Branch and bound method to solve : Maximize $Z = 7x + 9y$ subject to constraints : $-x + 3y \leq 6$, $7x + y \leq 35$, $y \leq 7$; $x \geq 0$, $y \geq 0$ and are integers.

17. Explain {(M/M/1):(N/FIFO)} system and solve it under steady state conditions.

18. Use Simplex method to solve the goal programming problem :

    Minimize $Z = P_1 d_1^- + 5P_3 d_2^- + 3P_3 d_3^- + P_2 d_4^+ + P_4 d_1^+$ subject to constraints :

    $x_1 + x_2 + d_1^- - d_1^+ = 80$, $x_1 + x_2 + d_4^- - d_4^+ = 90$, $x_1 + d_2^- = 70$, $x_2 + d_3^- = 45$,
    $x_1, x_2, d_1^-, d_1^+, d_2^-, d_3^-, d_4^-, d_4^+ \geq 0$

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.