PART – C (1×15=15 Marks)

16. a) The following indicates the details of a project. The durations are in days. 'A' is denoted as optimistic time, 'M' denoted as most likely time, and 'P' denoted as pessimistic time duration.

Activity	1-2	1-3	1-4	2-4	2-5	3-4	4-5
A :	2	3	4	8	6	2	2
M :	4	4	5	9	8	3	5
P:	5	6	6	11	12	4	7

i) Draw the network (3)

ii) Find the critical path (5)

iii) Determine the expected standard deviation of the completion time. (7)

(OR)

b) A Project schedule has the following characteristics :

Activity	1-2	1-4	1-7	2-3	3-6	4-5	4-8	5-6	6-9	7-8	8-9
Duration	2	2	1	4	1	5	8	4	3	3	5

i) Construct a PERT network and find the critical path and the project duration. (7)

ii) Activities 2-3,4-5,6-9 each requires one unit of the same key equipment to complete it. Do you think availability of one unit of the equipment in the organization is sufficient for completing the project without delay; if so what is the schedule of these activities ? (8)

4-12 AN

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 91412

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Seventh Semester

Computer Science and Engineering

CS 6704 – RESOURCE MANAGEMENT TECHNIQUES

(Regulations 2013)

Time : Three Hours Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. List the four assumptions in Linear programming.
2. Difference between Feasible and Optimal solution.
3. Describe the principal components of Decision problem.
4. A firm manufactures two types of products A and B and sells them at profit of Rs. 2 on type A and Rs. 3 on type B. Each product is processed on two machines M1 and M2. Type A requires 1 minute of processing time on M1 and 2 minutes on M2. Type B requires 1 minute of processing time on M1 and 1 minute on M2. Machine M1 is available for not more than 6 hours 40 minutes while Machine M2 is available for 10 hours during any working day. Formulate the problem as a LPP so as to maximize the profit.
5. Define primal and dual problem.
6. What do you understand by cutting plane problem ?
7. Examine $f(x) = 6x^5 - 4x^3 + 10$ for extreme points.
8. What is Newton-Raphson Method ?
9. Write short notes on Time charts and resource levelling.
10. Bring out any four difference between PERT and CPM.

PART – B **(5×13=65 Marks)**

11. a) List out the graphical method procedure to solve simple linear programming problems of two decision variables.

(OR)

b) Write short notes on the following :

i) Alternate optimum solution. **(3)**

ii) Unbounded solution. **(5)**

iii) Infeasible solution. **(5)**

12. a) Use dual Simplex method to solve the LPP.

Maximize $Z = -3x_1 - 2x_2$

Subject to $x_1 + x_2 \geq 1$

$x_1 + x_2 \leq 7$

$x_1 + 2x_2 \geq 10$

and $x_1, x_2 \geq 0$

(OR)

b) Consider the problem of assigning four sales persons to four different sales regions as shown in the following table such that the total sales is maximized.

Sales man	Sales Region 1	2	3	4
1	10	22	12	14
2	16	18	22	10
3	24	20	12	18
4	16	14	24	20

The cell entries represent annual sales figures in lakhs of rupees. Find the optional allocation of the sales persons to different regions.

13. a) Solve the following LPP using dynamic programming approach :

Maximize $Z = 3x_1 + 5x_2$

Subject to $x_1 \leq 4$

$x_2 \leq 6$

$3x_1 + 2x_2 \leq 18$

and $x_1, x_2 \geq 0$

(OR)

b) Use Branch and Bound method to solve the following :

Maximize $Z = 2x_1 + 2x_2$

Subject to $5x_1 + 3x_2 \leq 8$

$x_1 + 2x_2 \leq 4$

and $x_1, x_2 \geq 0$ and integer.

14. a) Using Jacobian method Max $Z = 2x_1 + 3x_2$

Subject to $x_1 + x_2 + x_3 = 5$

$x_1 + x_2 + x_4 = 3$

and $x_1, x_2, x_3, x_4 \geq 0$

(OR)

b) Solve the nonlinear programming by Lagrangian multiplier method.

Minimize $Z = x_1^2 + 3x_2^2 + 5x_3^2$

Subject to the constraints $x_1 + x_2 + 3x_3 = 2$

$5x_1 + 2x_2 + x_3 = 5$

and $x_1, x_2, x_3 \geq 0$

15. a) Solve $2x^3 - 2.5x - 5 = 0$ for the root in [1,2] by Newton Raphson method.

(OR)

b) Minimize $f = x_1^2 + 2x_2^2 + 3x_3^2$

Subject to the constraints :

$k_1 = x_1 - x_2 - 2x_3 \leq 12$

$k_2 = x_1 + 2x_2 - 3x_3 \leq 8$

Using Kuhn-Tucker conditions.