b) A project has the following activities and other characteristics :

Time estimate (in weeks)

Activity	Preceding Activity	Most Optimistic	Most Likely	Most Pessimistic
A	–	4	7	16
B	–	1	5	15
C	A	6	12	30
D	A	2	5	8
E	C	5	11	17
F	D	3	6	15
G	B	3	9	27
H	E, F	1	4	7
I	G	4	19	28

Required :

i) Draw the PERT network diagram (3)

ii) Identify the critical path (3)

iii) Prepare the activity schedule for the project (3)

iv) Determine the mean project completion time (3)

v) Find the probability that the project is completed in 36 weeks (4)

Reg. No. :

Question Paper Code : 40920

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

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 any four application areas of Operation Research.

2. Give any two Limitations of Linear programming.

3. What do you understand by degeneracy in a transportation problem ?

4. How do you convert an unbalanced transportation problem into a balanced ?

5. Can you provide various types of integer programming.

6. State the importance of Integer Programming.

7. What is Newton Raphson method ?

8. Define Kuhn – Tucker conditions.

9. Differentiate between PERT and CPM.

10. Define Pessimistic time estimate in PERT.

PART – B (5×16=80 Marks)

11. a) An automobile manufacturer makes auto-mobiles and trucks in a factory that is divided into two shops. Shop A, which performs the basic assembly operation must work 5 man-days on each truck but only 2 man-days on each automobile. Shop B, which performs finishing operation must work 3 man-days for each truck or automobile that it produces. Because of men and machine limitations shop A has 180 man-days per week available while shop B has 135 man-days per week. If the manufacturer makes a profit of Rs. 300 on each truck and Rs. 200 on each automobile, how many of each should he produce to maximize his profit ?

(OR)

b) Garden Ltd. has two product Rose and Lotus. To produce one unit of Rose, 2 units of material X and 4 units of material Y are required. To produce one unit of Lotus, 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 Rose and Lotus Cost per unit of material X and material Y are Rs. 2.50 per unit and Rs. 0.25 per unit respectively.

Your are required :

i) To formulate mathematical model (8)

ii) To solve it for the minimum cost (Graphically). (8)

12. a) Find the initial basic feasible solution for the following transportation problem by VAM.

		D_1	D_2	D_3	D_4	Availability
	S_1	11	13	17	14	250
Origin	S_2	16	18	14	10	300
	S_3	21	24	13	10	400
	Requirements	200	225	275	250	

(OR)

b) Solve the assignment problem for maximization given the profit matrix (profit in rupees).

		Machines			
		P	Q	R	S
	A	51	53	54	50
Job	B	47	50	48	50
	C	49	50	60	61
	D	63	64	60	60

13. a) Solve the following mixed integer programming problem by Gomory's cutting plane algorithm :

Maximize $Z = x_1 + x_2$

Subject to $3x_1 + 2x_2 \leq 5$

$x_2 \leq 2$

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

(OR)

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

Maximize $Z = x_1 + 4x_2$

Subjects to constraints $2x_1 + 4x_2 \leq 7$

$5x_1 + 3x_2 \leq 15$

$x_1, x_2 \geq 0$ and integers.

14. a) Illustrate Newton – Raphson method with suitable example.

(OR)

b) Illustrate Kuhn – Tucker Conditions with an example.

15. a) Draw the network from the following activity and find the critical path and total duration of project.

Activity	Immediate Predecessors	Duration (Weeks)
A	–	3
B	–	8
C	A	9
D	B	6
E	C	10
F	C	14
G	C, D	11
H	F, G	10
I	E	5
J	I	4
K	H	1

(OR)