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)

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)**