B.C.A. DEGREE EXAMINATION,APRIL 2019
III Year V Semester
Resource Management Techniques

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Define operations Research.
2. Define a Slack variable.
3. What is an unbalanced Assignment problem? How do you convert it to a balanced problem?
4. What is Degeneracy in a Transportation Problem?
5. Define a Sequencing Problem.
6. What is no passing rule in a sequencing problem?
7. Define a two person zero sum game.
8. Define saddle point.
9. Define critical path.
10. What are the time estimates in a PERT network?
11. Write any two characteristics of OR.
12. Define a travelling salesman problem.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. List the characteristics of a LPP in standard form.
14. Obtain an Initial Basic Feasible Solution using matrix minima method for the following Transportation problem.

		Destinations				
		1	2	3	4	Supply
	1	2	3	11	7	6
Origins	2	1	0	6	1	1
	3	5	8	15	9	10
Requirement		7	5	3	2	17

15. Suppose we have five jobs, each of which has to be processed on two machines A & B in the order AB.

    Processing times are given in the following table:

Job	1	2	3	4	5
Machine A	6	2	10	4	11
Machine B	3	7	8	9	5

    Determine an order in which these jobs should be processed so as to minimize the total processing time.

16. Solve the game using principle of Dominance.

8	10	9	14
10	11	8	12
13	12	14	13

17. Draw the network and find the critical path and project duration

Activity:	A	B	C	D	E	F
Duration:	6	8	4	9	2	7
Predecessors:	None	A	A	B	C	D

18. Find the game value and the saddle point

PLAYER B						
PLAYER A		I	II	III	IV	V
	1	1	3	2	7	4
	2	3	4	1	5	6
	3	6	5	7	6	5
	4	2	0	6	3	1

19. Solve the following Assignment problem.

		Machines			
		1	2	3	4
	A	2	3	4	5
Jobs	B	4	5	6	7
	C	7	8	9	8
	D	3	5	8	4

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Solve using Simplex method.

    Maximize $Z = 4x_1 + 3x_2 + 6x_3$,

    S.T $2x_1 + 3x_2 + 2x_3 \leq 440$, $4x_1 + 3x_3 \leq 470$, $2x_1 + 5x_2 \leq 430$, $x_1, x_2, x_3 \geq 0$.

21. Find the optimal solution for the following Transportation problem.

	1	2	3	4	5	Available
A	7	6	4	5	9	40
B	8	5	6	7	8	30
C	6	8	9	6	5	20
D	5	7	7	8	6	10
Required	30	30	15	20	5	100

22. There are 5 jobs, each of which has to go through the machines A and B in the order AB. The processing times(in hours)are given as

Job:	J1	J2	J3	J4	J5
Machine A:	2	4	5	7	1
Machine B:	3	6	1	4	8

Determine a sequence of these jobs that will minimise the total elapsed time T. Also obtain:

a) the minimum elapsed time; and b) the idle time for each of the machines

23. Solve the following 2*4 game graphically.

		B			
		I	II	III	IV
	I	2	2	3	-1
A	II	4	3	2	6

24. A project has the following characteristics

Activity	1-2	2-3	2-4	3-5	4-5	4-6	5-7	6-7	7-8	7-9	8-10	9-10
T0	1	1	1	3	2	3	4	6	2	5	1	3
Tp	5	3	5	5	4	7	6	8	6	8	3	7
Tm	1.5	2	3	4	3	5	5	7	4	6	2	5

Construct a PERT network. Find critical path and variance for each event. Find the project duration at 95% probability.