SUBJECT CODE : MT/GE/OR24

B.A./B. Sc./B.Com./B.C.A/B.S.W. DEGREE EXAMINATION, APRIL 2009
SECOND SEMESTER

COURSE	:	GENERAL ELECTIVE
PAPER	:	OPERATIONS RESEARCH
TIME	:	2 HOURS

MAX. MARKS : 100

SECTION – A

ANSWER ANY TEN QUESTIONS: (10X2=20)

1.   Define OR

2.   State any two characteristics of OR.

3.   What are the different methods of obtaining an initial feasible solution to a

       transportation problem?

4.   Solve the following assignment problem to minimize total time

Job

Time in hours

		J1	J2	J3	J4	J5
	M1	7	5	9	8	11
	M2	9	12	7	11	10
Machines	M3	8	5	4	6	9
	M4	7	3	6	9	5
	M5	4	6	7	5	11

5.   Define an unbalance assignment problem.

6.   Seven jobs go first over machine I and then over machine II , processing time in
      hours are given as

Job	A	B	C	D	E	F	G
Machine I	6	24	30	12	20	22	18
Machine II	16	20	20	12	24	2	6

      Find the optimal sequence in which the jobs should be processed.

7.   Define a strategy. What are the different types of strategy?

8.   Find the saddle point of the following game:

Player B

		B1	B2	B3	B4
	A1	20	15	12	35
	A2	25	14	8	10
Player A	A3	40	2	10	5
	A4	-5	4	11	0

9. State Dominance Principle.

10. Define (i) Event   (ii) Critical Path

11. What are the different types of time estimates in PERT?

12. Explain the term resource smoothing in network.

SECTION – B
ANSWER ANY FOUR QUESTIONS: **(4X20=80)**

13. a) A manufacturer wants to ship 22 loads of his product as given below. The matrix gives the kilometres from sources of supply to the destination.

Destination

		D1	D2	D3	D4	D5	Supply
	S!	5	8	6	6	3	8
Source	S2	4	7	7	6	5	5
	S3	8	4	6	6	4	9
Demand		4	4	5	4	8	

Shipping cost is Rs.10/load/km. What shipping schedule should be used to minimize total transportations cost?

b) Give the mathematical formulation of an assignment problem.

(15+5)

14. a) Solve the following traveling salesman problem to minimize the total cost.

To

Cost-lines '000

		A	B	C	D	E
	A	∞	2	5	7	1
	B	6	∞	3	8	2
From	C	8	7	∞	4	7
	D	12	4	6	∞	5
	E	1	3	2	8	∞

b) Reduce the following two-person zero sum game to 2×2 game and obtain optimal strategies for each player and the value of the game.

Player B

		B1	B2	B3	B4
	A1	3	2	4	0
Player A	A2	3	4	2	4
	A3	4	2	4	0
	A4	0	4	0	8

(10+10)

15.   A project has the following time schedule.

Activity	Time (in months)	Activity	Time (in months)
1-2	2	3-7	5
1-3	2	4-6	3
1-4	1	5-8	1
2-5	4	6-9	5
3-6	8	7-8	4
		8-9	3

(i) Draw the network
(ii) Find the earliest and latest times for each event
(iii) Determine the critical path and its duration
(iv) Determine the total and free float.

16.   a) XYZ Company has five jobs A,B,C,D,E to be done and five men L,M,N,O,P
        to do these jobs. The number of hours each man would take to
        accomplish each job is given by the following table.

                                    Men

		L	M	N	O	P
	A	4	6	11	16	9
	B	5	8	16	19	9
Jobs	C	9	13	21	21	13
	D	6	6	9	11	7
	E	11	11	16	26	11

Find the optimal schedule with time for the assignment problem to
minimize total cost.

b) Discuss the differences between CPM and PERT.

17.   a) Find the sequence, for the following eight jobs, that will minimize the total
        elapsed time for the completion of all the jobs. Each job is processed in
        the same order CAB. Entries give the time in hours on machines.

		1	2	3	4	5	6	7	8
Jobs Times	A	4	6	7	4	5	3	6	2
on	B	8	10	7	8	11	8	9	13
Machines	C	5	6	2	3	4	9	15	11

b) Solve the game given in the table below by graphic method:

                            Player B

		B1	B2	B3	B4
	A1	19	6	7	5
	A2	7	3	14	6
Player A	A3	12	8	18	4
	A4	8	7	13	-1

..4

18. A Project consists of the following activities and different time estimates

Activity	t_0	t_p	t_m
1-2	3	15	6
1-3	2	14	5
1-4	6	30	12
2-5	2	8	5
2-6	5	17	11
3-6	3	15	6
4-7	3	27	9
5-7	1	7	4
6-7	2	8	5

(i) Draw the network
(ii) Determine the expected task times and their variances.
(iii) Find the earliest and latest expected times to reach node.
(iv) Find the critical path
(v) What is the probability that the project will be completed by 27 days

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