

To From	J ₁	J2	J3	J4
01	12	10	10	8
02	14	12	15	11
03	6	10	16	4
O ₄	8	10	9	7

How should the manager assign the jobs so that the total time needed for all jobs is minimum ?

16. The following are the details of estimated times of a certain project.

Activity	Immediate predecessors	Normal time (days)	
А	-	16	
В	-	20	
С	A	8	
D	A	10	
E	В, С	6	
F	D,E	12	

Draw the network(arrow) diagram and find the critical path. Also find the expected time of the project.

17. Explain the following methods used to find the initial solution to a transportation problem:

(i) North-west corner rule (ii) Least-cost method and (iii) Vogel's approximation method. (2+2+4)

18. Explain the procedure for solving (2 x n) and (m x 2) games graphically. (4+4)

Section C

Answer any **TWO** questions

 $2 \ge 20 = 40$ marks

19. Use Penalty (Big M) method to Maximize $z = 3x_1 - x_2$ subject to the constraints: $2x_1 + x_2 \ge 2$ $x_1 + 3x_2 \le 3$ $x_2 \le 4$ x_1, x_2 are non-negative.

20. Find the optimum solution to the following transportation problem:

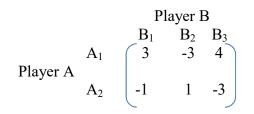
Warehouse	Ι	II	III	IV	Capacity
Factory					
А	42	48	38	37	160
В	40	49	52	51	150
С	39	38	40	43	190
Demand	80	90	110	160	

21. The following optimistic (O), pessimistic (P) and most likely (M) time estimates(days) for each task have been given for a project:

Task	Predecessors	0	М	Р
А	-	10	12	15
В	-	6	10	16
С	A,B	3	5	10
D	С	8	12	17
E	C	4	7	12
F	C	3	4	6
G	D,E	5	8	13
Н	F,G	5	7	10

Construct the network diagram for this project and find the critical path. Also find the expected duration of the project.

22. Solve the following problem graphically:



&&&&&&&&&&&&