

(6 pages)

MAY 2015

**P/ID 77508/PMBH/
PMB1H/PMBSJ**

Time : Three hours

Maximum : 100 marks

PART A — (5 × 6 = 30 marks)

Answer any FIVE questions.

1. Solve the L.P.P. using graphical method

$$\text{Maximize } Z = 3x_1 + 4x_2$$

Subject to

$$x_1 + x_2 \leq 450$$

$$2x_1 + x_2 \leq 600$$

2. What are the essential characteristics of linear programming model?
3. Give the guidelines for constructing network.
4. Find the critical path for the following data :
A : 1-2 1-3 2-3 2-4 3-4 4-5 4-6 5-6
T : 4 6 3 10 10 8 10 6
5. Explain the cost aspects in quecing theory.

6. A branch of bank has one typist. The typing rate is randomly distributed approximately a Poisson distribution with mean service rate of 8 letters per hour. The letters arrive at a rate of 5 per hour during the entire 8-hours work day. Determine.
- (a) Equipment utilization
(b) Average system time.
7. Specify the necessity for maintaining inventory.
8. Solve the game where payoff matrix is

	y	
x	3	1
	1	6

PART B — (5 × 10 = 50 marks)

Answer any FIVE questions.

9. Maximize $Z = 2x_1 + 3x_2 + x_3 + 7x_4$

Subject to

$$8x_1 + 3x_2 + 4x_3 + x_4 \leq 6$$

$$2x_1 + 6x_2 + x_3 + 5x_4 \leq 3$$

$$x_1 + 4x_2 + 5x_3 + 2x_4 \leq 7$$

$$x_1, x_2, x_3, x_4 \geq 0$$

2 **P/ID 77508/PMBH/
PMB1H/PMBSJ**

10. Assign 4 trucks to six vacant space to minimize distance

	1	2	3	4
1	4	7	3	7
2	8	2	5	5
3	4	9	6	9
4	7	5	4	8
5	6	3	5	4
6	6	8	7	3

11. The following table represents a set of activity times for a PERT network. Determine expected time and S.D. for each activity

Activity :	A	B	C	D	E	F	G	H	I	J	K	L
t_0 :	10	12	8	4	0	12	6	9	4	0	5	9
t_m :	13	15	11	7	0	18	12	12	6	0	8	12
t_p :	22	18	20	16	0	36	18	27	8	0	11	33

12. Given are some project details :

Job	Normal duration	Minimum duration	Cost/day
1-2	9	6	20
1-3	9	5	25
1-4	15	10	30
2-4	5	3	10

3 **P/ID 77508/PMBH/
PMB1H/PMBSJ**

Job	Normal duration	Minimum duration	Cost/day
3-4	10	6	15
4-5	2	1	40

What is normal project length and minimum project length? Overhead cost is Rs. 60 per day. What is the optimal project schedule?

13. A repairman is to be hired to repair machines which breakdown at an average rate of 3/hr which follows Poisson distribution. Non-production time of a machine is Rs. 10/hr. Two repairmen have been interviewed –one is slow but cheap other is fast and expensive. Slow man charges Rs. 5/hr and services machine at the rate of 4/hr. The fastman demand 7/hr and his rate of service is 6/hr. Which repairman should be hired?
14. A company producing three items has limited storage space of averagely 750 items of all types determine the optimal production quantities for each item separately, for the given information

Product	1	2	3
Holding cost	0.05	0.02	0.03
Setup cost	50	40	60
Demand rate	100	120	75

4 **P/ID 77508/PMBH/
PMB1H/PMBSJ**

[P.T.O.]

15. Schedule the given four jobs in three machines. Given are the processing time. Calculate the total elapsed time idle time for the three machines.

Job	Shaping	Prilling	Tapping
1	13	3	18
2	18	8	4
3	8	6	13
4	23	6	8

16. Find the optimum strategies Y and the value of the game

	y				
x	4	-1	4	-1	2
	2	2	3	-4	2
	1	-3	1	0	-4

PART C — (1 × 20 = 20 marks)

Compulsory.

17. A company has factories at four different places which supply warehouses A, B, C, D and E. Monthly factory capacities are 200, 175, 150 and 325 respectively. Monthly warehouse requirements are 110, 90, 120, 230 and 160. Unit shipping costs are.

5 **P/ID 77508/PMBH/
PMB1H/PMBSJ**

	A	B	C	D	E
1	13	–	31	8	20
2	14	9	17	6	10
3	25	11	12	17	15
4	10	21	13	–	17

Determine the optimum shipping cost.

6 **P/ID 77508/PMBH/
PMB1H/PMBSJ**