(3 Hours) Total marks: 80

N.B.

1. Question No.1 is compulsory
2. Answer any three questions out of remaining five questions
3. Figure to the right indicate full marks.
4. Assume suitable data if required.
5. Use of normal distribution table is allowed.

Q.1 Answer the following **(Any four)** **20**

1) Types of manufacturing systems
2) EOQ & EBQ
3) Two bin system
4) Gantt chart
5) Advantages of simulation

Q.2 a. A manufacturing company has a product line consisting of five workstations in series. The individual work capacities are given in table. The actual output of line is 500 units/shift. Calculate **8**

1. System capacity
2. Efficiency of production line.

Workstation	A	B	C	D	E
Capacity/shift	600	650	650	550	600

b. Maximize Z = 6x + 11y **12**

S.T.

$2x+y \leq 104$

$x + 2y \leq 76$

$x, y \geq 0$

Q.3 a. A company produces two products X and Y. Each unit of product X requires 3 hours of operation 1 and 4 hours of operation 2, while each unit of product Y requires 4 hours of operation 1 and 5 hours of operation 2. Total time available for operation 1 and operation 2 is 20 hours and 26 hours respectively. The production of each unit of product Y results in 2 units of by product Z at no extra cost. **5**

Product X sells at a profit of Rs. 10 per unit while Y sells at a profit of Rs. 20 per unit. Byproduct Z brings a profit of Rs. 6 per unit if sold; Incase if doesn't sold, the destruction cost is Rs. 4 per unit. Forecast indicates that not more than 5 units of Z can be sold.

Formulate the given problem for maximum profit.

b. Table below shows activities of a small project. **15**

Activity	A	B	C	D	E	F	G	H	I	J
Immediate Predecessor	-	A	A	A	B	C,D	D	B	E,F,G	G
Duration	2	3	4	5	6	3	4	7	2	3

a. Construct an activity network.
b. Determine the earliest finish date for the entire project, assuming the project begins at 0
c. The total float for each activity.

d. The critical path.
e. The latest start day for activity B.
f. The earliest finish date for activity F.

Q.4 a. A company manufactures washing machines. The survey shows the following record of population in city in million and demand of washing machines in thousand. **10**

population in city(million)	5	7	15	22	27	36
Demand (thousand)	28	40	65	80	96	130

By linear regression estimate the demand when city population is 50 million.

b. Five men are available to do five different jobs. The time taken by them is shown in following matrix. Find the assignment of man to job to minimize the total time taken. **10**

Men	Jobs				
	I	II	III	IV	V
A	2	9	2	7	1
B	6	8	7	6	1
C	4	6	5	3	1
D	4	2	7	3	1
E	5	3	9	5	1

Q.5 a. What are the assumptions in transportation problems? **5**

b. A pharma company has a demand for 10000 bottles. Each empty bottle cost the company Rs.1.0/-.The ROL system of stock replishment is followed. Ordering cost is Rs. 12.5/- per order and inventory carrying cost is 25% of cost per bottle. Demand is constant throughout the year. Lead time is 15 days. Determine **15**

1. EOQ
2. Lead time consumption
3. Reorder level
4. Average inventory.

Q.6 Answer the following **20**

a. Aggregate planning
B. Computer aided PP systems.
c. Dispatching- Function of MPC
d. JIT system

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