Time : 3 hours   Full Marks : 70

Use separate answer script for each half
Answer SIX question, taking THREE from each half,
The questions are equal value

FIRST HALF

1 a) Define sales forecasting. Discuss the importance of forecasting for production and sales.

 b) Describe the steps in sales forecasting and also discuss the factors affecting forecasting. Discuss the types of forecasting.

2 a) Name the various method of sales forecasting. Describe linear Regression method.

 b) The demand for a product for the past 10 years is given below:

Year	1	2	3	4	5	6	7	8	9	10
Demand	50	48	52	54	53	60	62	54	56	78

Estimating the demand for the 11th year by the method of weighed moving averages, taking the date for the least four years.

3 a) What are the objective of inventory control? Describe the expression for economic order quality (EOQ)

 b) An enterprise consumes 48000 units of a material costing Rs. 1.2 per unit. Procurement cost for each order is Rs. 45 and carrying cost rate is 15% per year of inventory cost (a) Find the EOQ. (b) Supposing that the enterprise operations 300 days a year and following EOQ purchasing policy and that

the procurement time 12 days. If the safety stock is 500 units, find the reorder point , the maximum, minimum and average level of inventory.

4 a) An organization generally seeks to accomplish certain objectives with regards to Quality. Narrate the objectives.

 b) What is TQM . What are the goals of TQM. Explain the term customer orientation and level of customer expectations.

5. Short note (Ans any Four)

a) Quality planning   b) Control chart c) Continuous improvement

c) Acceptance sampling. d) Six sigma e) ISO 9000

Subject : Operation Management   Code No. ME 704
                                                   Branch. Mechanical Engineering

i)   Use separate Answer script for each half.
ii)   The questions are of equal value
iii)   Answer any three questions

SECOND HALF

6. (a) A manufacturer of wooden articles produces tables and chairs which require two types of inputs mainly, they being wood and labour. The manufacturer knows that for a table 3 units of wood and 1 unit of labour are required while for a chair they are 2 units each. The profit from each table is Rs. 20 while it is Rs. 16 for each chair. The total available resources for the manufacturer are 150 units of wood and 75 units of labour. The manufacturer wants to maximize his profit by distributing his resources for tables and chairs. Formulate the problem mathematically.

   (b) A firm manufactures 3 products A, B and C. The profits from A, B and C are Rs. 6, Rs. 4 and Rs. 8 respectively. The firm has two machines and given below is the required processing time (in minutes) for each machine on each product.

Machine	Product		

	A	B	C
X	6	6	10
Y	4	4	8

Machine X and Y have 4000 and 5000 machine minutes respectively. The firm must manufacture 200 A's, 400 B's and 100 C's but not more than 300 A's. Set up a LP problem to maximize profit.

7. Solve the following transportation problem by north west corner method and least cost method. Cell values are unit transportation cost in Rs.

Origin↓ / Destination→	D1	D2	D3	D4	Supply
O1	11	13	17	14	250
O2	16	18	14	10	300
O3	21	24	13	10	400
Demand	200	225	275	250	

8. HMT L TD. decides to make four subassemblies trough four contractors. Each contractor is to receive only one subassembly. The cost of each subassembly is determined by the bids submitted by each contractor and is shown in the following table in hundreds of rupees. Assign the different subassemblies to contractors to minimize the total cost.

Subassemblies	Contractors			
	1	2	3	4
1	15	13	14	17
2	11	12	15	13
3	13	12	10	11
4	15	17	14	16

9.An airline has one reservation clerk on duty at a time. He handles information about flight schedules and makes reservations. All calls to the airline are answered by an operator. If a caller requires information or reservation, the operator transfers that call to the reservation clerk. If the clerk is busy, the operator asks the caller to wait. When the clerk becomes free the operator transfers to him the call of the person who has been waiting for the longest. Assume that arrivals and services follow Poisson and exponential distribution respectively. Calls arrive at a rate of 10 per hour, and the reservation clerk can service a call in 4 minutes on average.

i)   What is the average number of calls waiting to be connected to the reservation clerk?
ii)   What is the average time a caller must wait before reaching the reservation clerk?
iii)   What is the average time for a caller to complete a call?

10. Consider a project having following activities and their time estimates. Draw network diagram for the project. Identify the critical path and compute the expected project completion time and standard deviation for expected project completion time.

Activity	Predecessor/s	To days	Tm days	Tp days
A	----	2	4	6
B	A	8	12	16
C	A	14	16	30
D	B	4	10	16
E	C, B	6	12	18
F	E	6	8	22
G	D	18	18	30
H	F, G	8	14	32