

**Duration: 3 Hours**

**Total Marks: 80**

- 1. Question 1 is Compulsory
- 2. Attempt any three questions out of the remaining five.
- 3.. All questions carry equal marks
- 4.. Assume suitable data, if required and state it clearly.

**Q 1** Answer **any four** questions **20**

- 1.Draw Production systems line sketch and list out production system components
- 2.List out Production planning and control functions
- 3.Explain Product Life cycle with diagram
- 4. Explain various terms associated with line balancing.
- 5. Write notes on MRP flow chart
- 6. Explain the objectives of Facility planning.

**2 a)** A company manufactures the consumer durable products and the company intends to develop an aggregate plan for six months starting from January through June. The following information is available. **10**

Month	Jan	Feb	Mar	Apr	May	Jun
Demand	500	600	650	800	900	800
Working days	22	19	21	21	22	20

**Cost Details**

Materials Rs. 100/unit, Inventory carrying cost - Rs. 10/unit/month,  
Cost of stock out Rs. 20/unit/month, cost of subcontracting Rs.200/unit,  
Hiring and training cost Rs. 50/worker, Lay off cost Rs.100/ worker,  
Labor hours required Rs. 4/unit, Regular time cost (for first 8hours) Rs.12.50/-per hour  
Over time cost Rs.18.75/- Per hour, Beginning inventory 200 units. Safety stock required –Nil

**Work out the cost of the constant work force – Varying inventory and allow shortages Strategy**

**Q2 b)** Define (i) Design capacity (ii) System capacity (iii) Installed capacity (iv) Licensed capacity (v) Rated capacity **10**

**Q3 a)** Define process design and explain the framework of process design by means of a block diagram? **10**

**Q3 b)** The following data refers to the past sales of one product. **10**

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023
Sales in Lakhs	3.9	5.4	6.2	7.3	8.5	10	9.5	10.5	12

Use Least square method and estimate sales forecasting of year 2024

**Q4 A)** Seven jobs are to be processed through three machines A,B and C in the sequence ABC. The processing times are given in hrs to process each one of the jobs through all the three machines. Find the optimal sequence of the jobs that minimizes the total elapsed time and find idle time associated with machines B and C **10**

Jobs	J1	J2	J3	J4	J5	J6	J7
A	3	8	7	4	9	8	7
B	4	3	2	5	1	4	3
C	6	7	5	11	5	6	12

**Q4 B)** . Explain the various terms associated with MRP. Explain the steps of creating MRP master schedule with any end item X. **10**

**Q5 A)** 4.) A small project is composed of time activities whose time estimates are given below **10**

Activity	A	B	C	D	E	F	G	H	I
$t_o$	2	2	4	2	2	3	2	5	3
$t_m$	2	5	4	2	5	6	5	8	6
$t_p$	8	8	10	2	14	15	8	11	15

$t_o$  - Optimistic time,  $t_m$  - Most likely time,  $t_p$  - Pessimistic time , Activity A,B and C can start simultaneously. Activity D follows activity A while E follows B. Activity D and E are followed by activity G while F is dependent on C , H depends on D and E While I depends on F and G (i) Construct the network diagram (ii) determine Expected time and variance (iii) What is the critical path and expected project duration of the project

**Q5 B)** Define plant layout? What are the various types of layout? Explain the application of each layout **10**

**Q6 (A)** Explain ERP modules for operation planning and materials management **10**

**Q6 B)** Explain Agile Manufacturing systems with block diagram and features compare with other production system **10**

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