(Three Hours)   **Total Marks: 80**

N.B.: (1) Question No. 1 is compulsory.
   (2) Answer any **three** questions out of the remaining **five** questions.
   (3) Figures to the right indicate full marks.
   (4) Illustrate answers with neat sketches where ever required.
   (5) Answers to the questions should be grouped and written together.
   (6) Assume suitable data if required.

Q1.   Answer any four
   (a) What are the components and types for a Manufacturing systems   5
   (b) What are the prerequisites of PPC   5
   (c) Define the terms: lead time, safety stock, reorder point and maximum inventory. 5
   (d) What are the characteristics of forecasting?   5
   (e) Explain optimistic time, most likely time and pessimistic time for PERT.   5

Q2. (a) How the size of an organization affects the various Factors which influence the   10
         PPC.
   (b) What is a work order? What is its importance? Explain with suitable example.   10

Q3. (a) The demand for an item is deterministic and constant over time and is equal to   10
         600 units per year. The unit cost of the item is Rs.50 while the cost of placing an
         order is Rs.5. The inventory carrying cost is 20% of the cost of inventory per
         annum and the cost of shortage is Rs.1 per month. Find the optimal ordering
         quantity when stock outs are permitted. If the stock outs are not permitted what
         would be the loss to company.
   (b) Explain **any one** with example: 10
         1. Two bin system of inventory control
         2. ABC analysis for inventory Control

Q4. (a) Why process planning is needed? Explain the various types of Computer Aided   10
         Process Planning.
   (b) The following data gives the sales of the company for the various years. Fit the   10
        straight line and forecast the sales for the year 2018 and 2019. [Tabulate the
        calculations]

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017
Sale Rs. (000)	13	20	20	28	30	32	33	38	43

Turn Over

Q5. (a) Discuss the importance of process planning. Also discuss in brief the types of process planning.   10

(b) A company has three factories X, Y, Z. It supplies goods to four warehouses W1, W2,   10
W3 and W4. The production capacities of the factories and demand of the warehouses
are as shown in the table. Determine the optimal solution of the problem.

		Warehouse				
		W1	W2	W3	W4	Production Capacity
	X	19	30	50	12	7
Factory	Y	70	30	40	60	10
	Z	40	10	60	20	18
Demand		5	8	7	15	

Q6. (a) Consider the LPP and solve by Simplex method   10

$$\text{Maximize } Z = 4X_1 + 3X_2 + 6 X_3$$
Subject to
$$2X_1 + 3X_2 + 2 X_3 \le 440$$
$$4X_1 + 32X_3 \le 470$$
$$2X_1 + 5X_2 \le 430$$
$$X_1, X_2, X_3 \ge 0$$

(b) A Project consist of following six activities :   10

Activity	Normal time N(t)	Crash time (ct)	Normal cost	Crash cost
1—2	3	2	1600	1800
1—3	7	5	1400	2000
2—3	5	3	2500	3000
3—4	4	3	500	800
3—5	2	1	4200	4400
4—5	8	6	1600	2600

   i. Draw the network for the activities stated above
   ii. Identify the Critical Path
   iii. What is Total Project duration and associated cost.
   iv. If the duration of project to be reduced by 1 week, which activity or
activities duration to be reduced? What will be the total project cost?