

M. E. (M E) 1 St Semester Examination, 2011

**Design of Production System
(M E – 918)**

Time: 3 hours

Full Marks: 70

Answer any five questions.
All questions are of equal value.

1. (a) Discuss continuous versus Intermittent Models of Production system.
(b) Explain the elements of feed back control loop of a production system.
2. (a) What do you mean by Productivity? Discuss different inputs and Productivity measures. What is Multifactor productivity of an organization?
(b) An electrical equipment manufacturing company manufactures AC Motors, DC Motors and Transformers. During the month of October 2011, the production of these items in rupees terms has been respectively, Rs 140 million, Rs 250 million and Rs 90 million. The inputs of human resources, capital, materials and power have been given in the following table.

Products

Inputs in Rs. million	AC Motors	DC Motors	Transformer
Human	14	23	12
Capital	28	81	14
Materials	72	108	24
Power	9	20	10

What are the partial productivity of each of the inputs? What are the total productivities of each of three products? What is the total factor productivity of the company?

3(a) Discuss A Generalized Descriptive Model of Production. Explain with the flow diagram Production Planning as an integral part of the Corporate Planning Process.

(b) Discuss the importance of Time- Horizon in Planning process.

4(a) Quarterly sales in ten thousand rupees for a product is given in the following table

Year	2006	2007	2008	2009	2010
Qtr 1	190	280	270	300	320
Qtr 2	370	420	360	430	440
Qtr 3	300	310	280	290	320
Qtr 4	220	180	190	200	220

Using least square method forecast sales in the year 2011.

(b) Find the initial basic feasible solution to the following transportation problem using Vogel's approximation method. The cell entries are unit transportation costs in Rupees.

From / To	1	2	3	4	Supply
1	20	30	110	70	60
2	10	0	60	10	10
3	50	80	150	90	100
Demand	70	50	30	20	

5. (a) Four different jobs can be on four different machines. The set-up and take down time costs are assumed to be prohibitively high for change over. The matrix below gives the costs in rupees of producing job J on machine M.

Machines/ Jobs	M1	M2	M3	M4
J1	5	7	11	6
J2	8	5	9	6
J3	4	7	10	7
J4	10	4	8	3

How should the jobs be assigned to the various machines, so that total cost is minimized?

(b) A Company buys 80,000 units of one product annually, ordering costs are Rs. 80/- per order. Purchase price Rs. 0.40/- per unit. Holding costs are Rs. 0.10/- per unit per year and interest charges 15% of purchase price. What is EOQ? What is the time between orders, based on 220 working days per order?

6. (a) Describe briefly Aggregate planning process.

(b) Which of the required inputs of aggregate planning are most difficult to obtain and Verify?

7.(a) Discuss Planning, Scheduling and control of project.

(b) Describe Net Work Scheduling of Project.

8.(a) Describe Materials Management system with a flow diagram.

(b) Assume a series of activities as follows:

Activity	Immediate Predecessor	To (Weeks)	Tm (Weeks)	Tp (Weeks)
(1-2)	-	12	15	24
(2-3)	(1-2)	7	8.5	10
(3-4)	(2-3)	2	8	20
(4-5)	(3-4)	4	5.5	10

Find the expected Time of occurrence of Event (5) and its Standard Deviation.