

**B.E. ELECTRONICS AND TELE-COMMUNICATION ENGINEERING FOURTH
YEAR SECOND SEMESTER EXAM 2017 (Old)**

Industrial Management

Time: Three hours

Full Marks: 100

Answer any four questions

1. (a) The following Table represents the actual tabulated demands for an item for a nine-month period (January through September). Your supervisor wants to test two forecasting methods to see which method is the best over this period.

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep
Actual	120	130	150	150	160	170	140	140	160

- i. Forecast April through September using a three-month moving average.
ii. Use simple exponential smoothing with $\alpha = 0.4$ and January forecast = 100 to forecast April through September.
iii. Compute MAE and MSE to decide which method produced the best forecast over the six-month period.
- (b) Discuss different data-patterns or components of a time series. [20 + 5]
2. (a) Explain the functions of a manager.
(b) What are the factors affecting to select a location?
(c) What is process layout? Explain its disadvantages. [10+10+5]
3. (a) The company XYZ has an annual demand of 4,000 units of an item. The cost of each item is Rs. 90. The cost of placing an order is Rs. 25 and the inventory carrying cost is Rs. 9. Assume 250 working days per year. Determine
i. EOQ
(b) Derive the formula of the EOQ you use in part (a).
(c) For a company following data is available.
Fixed cost = Rs. 2×10^5 ; variable cost /unit product = Rs. 200; price/unit product = Rs. 300; actual quantity of production produced by the company = 5000 units. Determine
i. The break-even volume
ii. The angle of incidence
iii. The margin of safety [10 + 5+ 10]

[Turn over

4. (a) A workshop has three (3) types of machines A, B and C; it can manufacture two (2) products 1 and 2, and all products have to go to each machine and each one goes in the same order; First to the machine A, then to B and then to C. The following table shows:
- The hours needed at each machine, per product unit
 - The total available hours for each machine, per week
 - The profit of each product per unit sold

Type of Machine	Product 1	Product 2	Available hours per week
A	2	2	16
B	1	2	12
C	4	2	28
Profit per unit	1	1.5	

Formulate and solve using graphical method a linear programming model to obtain maximum gain.

- (b) Consider the transportation problem presented in the following Table:

		Destination				
Origin	1	2	3	4	Supply	
1	20	22	17	4	120	
2	24	37	9	7	70	
3	32	37	20	15	50	
Demand	60	40	30	110		

Determine the minimum transportation cost by VAM. Show the steps and calculations. [15+10]

5. (a) What is reliability? Why is reliability engineering important in engineering design?
 (c) Develop the mathematical expressions for hazard rate and reliability estimation.
 (d) Discuss the bathtub curve with example. [2+4+12+7]

6. (a) An Electrical Company wants to know the present status of the process, which produces bulbs. In this context, the supervisor randomly collects 15 samples of size 5 as shown in the following Table in Volts. Draw the \bar{X} and R charts considering $A_2 = 0.52$, $D_4 = 2.11$ and $D_3 = 0$.

Sample	Obs 1	Obs 2	Obs 3	Obs 4	Obs 5
1	10.6	10.6	10.7	10.7	10.1
2	10.7	10.8	10	10.7	10.9
3	10.7	10.6	10.8	10.5	10.2
4	10.5	10	10	10.5	10.7
5	10.6	10.7	10.7	10.7	10.6
6	10.7	10.7	10.7	10.9	10.6
7	10.7	10	10.6	10.7	10.6
8	10.7	10.7	10.1	10.3	10.7
9	10.7	10.7	10.6	10.4	10.7
10	10.7	10.6	10.7	10.5	10.1
11	10.7	10.8	10.7	10.6	10.8
12	10.6	10.8	10.8	10	10.2
13	10.6	10	10.8	10.5	10.5
14	10.8	10.7	10	10	10.1
15	10	10.6	10.6	10.4	10.2

(b) What is the importance of a control chart?

(c) Write explanatory notes on Quality Circle, quality characteristics.

[10+5+10]

7. (a) Consider the following activities and draw the network. Find the critical path.

Activity	Immediate Predecessor	Estimated Time (weeks)
A	--	2
B	A	2
C	B	1
D	B	1
E	B	4
F	C	2
G	C	5
H	F, G	2
I	D, E, H	12
J	I	2

(b) Define: Dummy activity, critical path, dangling, node.

[15+10]