B. Tech. (F.T.B.E.) Final Year Examination (2nd Semester), 2019

Industrial Management

Time: Three hours　　　　**Answer any five questions.**　　　　**Full Marks: 100**

1. (a) Discuss the components of a time series in forecasting.
   (b) Name the different approaches to forecasting.
   (c) Historical demand for a product is:

Month	April	May	June	July	August	September
Actual	60	55	75	60	80	75

   (i) Using a four-month simple moving average, calculate a forecast for October.
   (ii) Using a four-month weighted moving average with weights of 0.4, 0.3, 0.2, and 0.1, calculate a forecast for October.
   (iii) Using single exponential smoothing with alpha =0.3, and August forecast = 65, calculate a forecast for October.　　　　$[4 + 4 + 12]$

2. (a) Each year a company purchases 18000 of an item that costs Rs. 16 per unit. The cost of placing an order is Rs. 12, and the cost to hold the item for a year is 30 percent of the unit cost. Determine (i)the economic order quantity, (ii)optimal no. of orders per year, (iii)the optimal order cycle time, (iv)average inventory level assuming that minimum inventory level is zero, and (v) total cost comprising total ordering cost and the carrying cost if the EOQ is used.
   (b)Derive the formula of the EOQ you use in part (a).
   (c)What is the significance of EOQ in inventory management?　　　　$[10 + 7 + 3]$

3. (a) Compare between flow shop and job shop scheduling.
   (b)Find the optimum sequence of jobs for processing them through two work centres in flow shop scheduling. Times at each centre are in hours. Compute the makespan for the optimum sequence of jobs and the corresponding idle times at the two work centres.　　　　$[5 + 15]$

Job	A	B	C	D	E	F	G	H
WC 1	10	8	12	11	10	12	10	5
WC 2	2	7	8	16	8	8	14	3

4. (a)For a company following data is available. Fixed cost = Rs. 300000, variable cost/unit product = Rs. 400, price/unit product = Rs. 600. Determine the break-even volume. What is the significance of break-even volume?
   (b)Use graphical method to solve the following LPP.
   Maximize Z = 7x1 + 3x2; subject to: x1 + 2x2 ≥3; x1 + x2 ≤4; 0≤x1≤5/2; 0≤x2≤3/2; and x1, x2 ≥0
   　　　　$[5 + 15]$

5. Given below is a group of jobs. Develop a network based on AOA for these jobs, minimizing as far as possible the no. of dummy activities. Also, determine the critical path. Discuss the significance of the critical path in project management.　　　　$[16 + 4]$

Job	A	B	C	D	E	F	G	H	I	J	K	L
Immediate predecessor(s)	----	-----	A	A	B	C,E	B	C,D	G	G	H,F	I,J
Time (days)	5	4	3	2	2	4	3	6	5	2	2	3

6. (a)Determine the initial feasible solution to the following transportation problem by using VAM.

		Destination				supply
		D1	D2	D3	D4	
	S1	1	5	1	1	40
Source	S2	4	3	6	8	30
	S3	3	2	5	9	40
Demand		30	40	30	10	

(b)Five men are available to do five different jobs. From past records, the time (in hrs) that each men takes to do each job is known and is given in the following table. Find the assignment of men to jobs that will minimize the total time taken.

		Job				
		1	2	3	4	5
	A	2	9	2	7	1
	B	6	8	7	6	1
Men	C	4	6	5	3	1
	D	4	2	7	3	1
	E	5	3	9	5	1

[10 + 10]

7. (a) Ten samples of 15 parts each were taken from an ongoing process to establish a control chart. The details are shown below. Develop a control chart from 95 percent (1.96 sd) confidence. Based on the plotted data, what comments can you make?

Sample	n	No. of defects in sample	Sample	n	No. of defects in sample
1	15	3	6	15	2
2	15	1	7	15	0
3	15	0	8	15	3
4	15	2	9	15	4
5	15	1	10	15	1

(b)Draw an OC curve in quality control. (c) What are natural variations and assignable variations?

[12 + 4 + 4]

8. (a) What are different types of plant layout? Compare between product layout and process layout.

(b) Discuss a method to select the factors for selecting a location for food processing industry.

(c) What are seven tools of total quality management? Discuss any one of them.

(d) What are ISO 9000 and ISO 1400? [5 + 5 + 5 + 5]