B.Ch.E. Final (2nd Semester) Examination, 2018

Industrial Management

Time: Three hours   Full marks: 100

Answer any **five** questions.

(All Parts of Any One Question Must Be Answered Together)

1. (a) Discuss contributions and limitations of The Human Relations School in the development Of Management Thought as it stands today.   12
   (b) "Management is both an Art & a Science"---- Discuss.   08

2. (a) List the factors you would consider while setting up a green field Oil Refinery.   10
   (b) What do you mean by Facility/Plant Layout. Differentiate between Product & Process Layout.   10

3. (a) A Company is presently having a production run of 500 units every 3 months. It is considering a review of its decision on the size of the production lot. The relevant information is given below:

   Annual demand of the item: 2000 units; Set-up cost: Rs300/ set-up;

   Inventory holding cost: Rs 1.60/unit/yr.

   (i) Would you recommend a change in the current production lot size? Why?

   (ii) What will be the cost saving, if any, as a result of the change?

   (iii) Deduce any formula used.   14

   (b) Define Reliability. An equipment is to operate for 10000 hrs.; Failure rate is estimated as one in 50000 hrs. Calculate the probability of survival.   06

4. (a) Following information pertain to a maintenance project-(Duration in days):

Activity	Normal Duration	Crash Duration	Normal Cost (Rs.)	Crash Cost (Rs)
1-2	10	7	400	640
1-3	19	11	600	1160
2-3	10	8	500	600
2-4	19	15	700	1000
3-4	10	4	300	810

   (i) Draw the network. What is the normal duration of the project?
   (ii) Crash the network by 2 days.
   (iii) Calculate the normal & crashed costs of the project.   12

[Turn over

4.(b) In a machine shop 8 different jobs are machined (in the order M/C A-> B) each requiring time in two machines A and B as given below:

Product	Time (in min.) on machine A	Time (in min.) on machine B
I	30	20
II	45	30
III	15	50
IV	20	35
V	80	36
VI	120	40
VII	65	50
VIII	10	20

Decide the optimum sequence of processing of the jobs in order to minimize the total machining time. Also, calculate the Total Elapsed Time (TET) for this sequence.   08

5. (a) Historical demand for a product is:

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

   i. Using a simple four-month simple moving average, calculate a forecast for October.
   ii. Using a three-month weighted moving average with weights of .5, .3, and .2, calculate a forecast for October.
   iii. Using single exponential smoothing with $\alpha = 0.6$ and August forecast = 65, calculate a forecast for October.

   (b) For a company following data is available. Fixed cost = Rs. 3×10^5; variable cost /unit product = Rs. 400; price/unit product = Rs. 600. Determine the break-even volume. What is the significance of the break-even volume?   [14+6]

6. (a) Each year the Yellowstone Company purchases 18,000 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 number of orders per year
   iii. The optimal order cycle time
   iv. Average inventory level assuming that the minimum inventory level is zero.

   (b) Derive the formula of the EOQ you use in part (a).   [15+5]

7. (a) Use the graphical method to solve the following linear programming problem:

$$\text{Maximize } z = 7x1 + 3x2$$
$$\text{subject to: } x1 + 2x2 \geq 3$$
$$x1 + x2 \leq 4$$
$$0 \leq x1 \leq 5/2$$
$$0 \leq x2 \leq 3/2$$
$$\text{and } x1, x2 \geq 0$$

   (b) Determine an initial basic feasible solution to the following transportation problem by using Vogel's approximation method.

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

[10+10]

8. (a) Data-entry clerks at ARCO key in thousands of insurance records each day. Samples of the work of 10 clerks are shown in the table. One hundred records entered by each clerk were carefully examined and the number of errors counted. Set the control limits to include 99.73% of the random variation in the entry process when it is in control. Construct the suitable control chart. Comment on your results.

Sample No.	1	2	3	4	5	6	7	8	9	10
No. of errors	6	5	0	1	8	7	11	6	2	5

(b) Discuss an O.C curve with a diagram. [14 + 6]

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