B.Ch.E. Final (2nd Semester) Examination, 2022

Industrial Management

Time: Four hours   Full marks: 70

Answer any **Seven**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.   05

(b)Justify the statement "Management is both an Art & a Science"   05

2. (a) List the factors you would consider while setting up a green field Oil Refinery. 07

(b) What is Facility/Plant Layout.   03

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.   10

4. A project consists of the following activities:

Activity	1–2	1–3	1–4	2–5	2–7	3–6
Duration (days)	2	2	1	5	8	4
Activity	4–7	5–8	6–8	7–9	8–9	
Duration (days)	3	4	1	5	3	

(i) Draw the network and identify the critical path.

(ii) Calculate the Early Start(ES), Early Finish(EF),Late Start(LS) & Late Finish(LF) times of the activities.   10

[Turn over

5. a) Time taken by M/cs A, B & C to complete jobs 1, 2 & 3 are as below: (in mins.)

Job / M/c	1	2	3
A	60	50	40
B	40	45	55
C	55	70	60

Complete the assignment so as to minimize the total time, hence calculate the total time.
(06)

(b) What is the significance of the break-even volume?

Fixed cost = Rs. 3 x 10^5;variable cost /unit =Rs. 400; If the price/unit = Rs. 600.

Determine the break-even volume.   (04)

6.   a) A biscuit company can produce three products P1, P2 and P3. Each of these products requires three different operations O1, O2 and O3. One unit of P1, requires 2h of O1, 2h of O2, and 3h of O3; one unit of P2 requires 3h of O1, 1h of O2, and 2h of O3; and one unit of P3 requires 4h of O1, 3h of O2, and 4h of O3. O1, O2 and O3.can operate for a maximum of 40 h, 50 h, and 150h respectively. The profit on each unit of P1, P2 and P3 is Rs 2, Rs 4, and Rs 3 respectively. If all the produce is sold, formulate the problem as an LPP to maximize the profit.
(05)

b)   Discuss ERG theory: a contemporary theory on motivation. How is it different from Maslow's hierarchy of needs?   (05)

7.   A firm has several machines and wants to install its own service facility for the repair of its machines. The average breakdown rate of the machines is three per day. Assume that the inter-arrival times are independent exponential variables and the repair time has exponential distribution. The loss incurred due to the lost time caused by the breakdown of an inoperative machine is Rs 40 per day. The firm has two repair facilities :A and B. While facility A requires an installation cost of Rs 20,000, facility B costs Rs 40,000. The total labour cost per year is Rs 5000 and Rs 8000 per year for A and B respectively. While A can repair 4.5 machines per day, B can repair five machines per day. Both these facilities have a life of four years. Which facility should be installed?   (10)

8.   Write short notes: (any two)   (10)

i) Cost of Quality   ii) Six Sigma   iii) Method Study   iv) Materials Requirement Planning (MRP)

9. a) Explain the concept of Production Planning and Control(PPC) in any major organization.
       (05)

   b) Write a comparison between Transportation and Assignment models (under sub-classes of
      Linear Programming Problems   (05)

10. a) Based on 15 subgroups each of size 200 taken at intervals of 45 minutes from a
        manufacturing process,the average-fraction defective was found to be 0.068.Calculate
        the values of central line , and the control limits for a suitable control chart under
        Statistical Quality Control (SQC).   (04)

   b) A company has two machines ,M1 and M2, on which five jobs are to be processed in the
       order M1M2.The processing time in hours (h), for each job on these machines is
       given as follows: .   (06)

Jobs ...... Machines :	J1	J2	J3	J4	J5
M1	5	1	9	3	10
M2	2	6	7	8	4

Find : i) the optimum job sequence   ii) the elapsed time, and c) the idle times for each machine
         M1 and M2.