Code: 9A03801

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B.Tech IV Year II Semester (R09) Regular Examinations, March/April 2013
PRODUCTION & OPERATIONS MANAGEMENT
(Mechanical Engineering)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions.
All questions carry equal marks.
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1 (a) What are the production/operations management problems and key decision in day today operations in an organization?
   (b) What is difference between the effectiveness and efficiency?

2 (a) Define sales forecasting. Explain its importance.
   (b) Find the MAD (Mean Absolute Deviation) and MSE (Mean Square Error) for the following forecast:

Month	1	2	3	4	5	6	7	8	9	10	11	12
Actual Demand	97	93	110	98	130	133	129	138	136	124	139	125
Forecasted Demand	100	100	100	100	102	104	106	108	110	112	114	116

3 (a) What is plant layout? Discuss objective and advantages of good plant layout.
   (b) Write notes on various computerized technique used in designing plant layout.

4 (a) What do you understand by aggregate plan?
   (b) Describe the relevant cost component involved in aggregate planning decision.

5 (a) What is safety stock? Why it is needed? Explain with suitable example.
   (b) An electrical housing has an annual usage rate of 75,000 unit/year, an ordering cost Rs.800 and annual carrying charge of 15.4% of the unit price. Delivery lead time is 2 weeks. Determine the optimal operating doctrine (Assume the cost of one unit is Rs.2)

6 (a) Find the sequence for the following 8 jobs that minimizes the total elapse time for the completion of all jobs. Each job is processed in the order CAB. Find the total elapsed time and idle time of each machine.

Machine Jobs	1	2	3	4	5	6	7	8
A	4	6	7	4	5	3	6	2
B	8	10	7	8	11	8	9	13
C	5	6	2	3	4	9	15	11

   (b) Distinguish between the Gantt chart and Gantt load chart.

7 (a) What are the inputs to material requirement planning?
   (b) What are the objectives of MRP?

8   Describe the lean management and philosophy to create a lean enterprise.

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1   (a)   Explain in detail on concept of production vs productivity.
     (b)   Describe the term productivity, and how it is used to measure in goods/service industry with suitable examples.

2   (a)   State the objective of:
          (i) Short term forecasting.
          (ii) Long term forecasting.
     (b)   What is meant by mean absolute deviation? What is its significance?
     (c)   State general principals of forecasting.

3   (a)   What are the principles for planning the layout of a new factory?
     (b)   List and brief on different mathematical model used for facilities layout.

4   (a)   Describe the single stage aggregate planning decision structure. State the decision process used for aggregate planning.
     (b)   What is MRP? What is its purpose?

5   (a)   What is economic order quantity? Derive the formula for determining EOQ.
     (b)   Write in brief on ABC and VED selective inventory control techniques.

6   (a)   Describe the factors affecting the scheduling.
     (b)   A company has an order for five jobs ABCD & E that must be processed sequentially through two work centers backing and decoration. The time in hours is required for the jobs are shown below. Determine the schedule of sequence that minimize the total lapse time for the five jobs and present it in the form of Gantt chart.

Work centers	Time required jobs (Hrs)				
	A	B	C	D	E
Banking	5	4	8	7	6
Decoration	3	9	2	4	6

7   (a)   Discuss various methods of line balancing.
     (b)   What is ERP? What are its main features?
     (c)   Write short notes on the following:
          (i) JIT Production.   (ii) MRP II.

8   (a)   Describe approach you would take to achieve the six sigma quality in an organization.
     (b)   What do you know about Mumbai dabba wala and their six sigma approach?

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1   (a)   What is production function? Explain it with hypothetical example.
    (b)   Write notes on factor productivity index.

2   (a)   State the advantage and limitation of sales forecasting.
    (b)   Using exponential smoothing techniques, compute the forecast from the following data (time series) under the situation when ($\alpha = 0.3$) compute the forecast for the 11th period.

Month	1	2	3	4	5	6	7	8	9	10
Demand	10	12	8	11	9	10	15	14	16	15

3   (a)   Explain various factors that are considered before layout of a plant.
    (b)   Write short notes with proper diagram on group layouts and process layouts.

4   (a)   Explain expediting.
    (b)   What single criteria priority decision rule might you expect to find an use with regards to the hospital emergency room?

5   (a)   Describe the cost associated with the inventories.
    (b)   The Mahavir paints limited would like to improve the inventory management policies for its supply of paints used for automobiles. Annual demand for such paint is 50000 liters and paint cost Rs.20/ltr. Annual carrying cost is estimated at 15% of the price of paint held. Each order cost Rs.80/- Determine
       (i) How much of the paint should be ordered each time?
       (ii) How often should the paint be ordered?
       (iii) What is total inventory cost?

6   (a)   What are the objectives of scheduling?
    (b)   Explain the terms forward scheduling and backward scheduling.

7   A toy manufacturing company intends to produce 10,000 pieces of a particular toy per year. It has identified 10 work elements with the following precedence restriction and duration.

Elements	1	2	3	4	5	6	7	8	9	10
Immediate precedence	-	1	2	3	4	4	6	5	7,8	9
Duration C Minutes	5	8	3	2	5	5	8	2	3	6

    (a) Draw a precedence diagram for the assembly of toys.
    (b) Design an assembly line for the cycle time of 13 minutes.
    (c) Calculate the following
      (i) Line efficiency. (ii) Balance delay. (iii) Smoothness index.

8   (a)   State Deming's 14 principles on total quality management.
    (b)   Elaborate your approach on TQM implementation in an organization.

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1   (a)   What factors do you consider during the selection of new products? Explain them appropriately.
    (b)   Brief on the issues encountered during the product design.

2   (a)   Describe exponential smoothing method of sales forecasting. State its advantage and limitation.
    (b)   Find the trend using the least square method for the data given below

Year	1975	1976	1977	1978	1979	1980	1981
Demand	85	75	80	72	65	60	55

3   (a)   Distinguish between the product layout and process layout. Under what conditions each type layout is appropriate.
    (b)   Write notes on symptoms of poor layout.
    (c)   Brief on various tools of layout engineering.

4   Describe aggregate planning with suitable diagram and explain pure strategies of aggregate planning.

5   (a)   Enumerate the various types of inventory models.
    (b)   What factor do you consider in fixing the maximum and minimum stock level?

6   (a)   Describe:
          (i) Master scheduling. (ii) Production scheduling.
    (b)   Draw a schedule chart and a load chart for the following data

	Time in Hrs on Machine	
Job	X	Y
A	2	4
B	5	2
C	1	3

          Give order of the machine is first on X and then on Y.

7   (a)   Difference between the line of balance and line balance.
    (b)   Define and explain:
          (i) Work element. (ii) Work station. (iii) Total work content. (iv) Station time.
          (v) Cycle time. (vi) Balance delay. (vii) Line efficiency. (viii) Smoothness index.
          (ix) Station idle time. (x) Precedence diagram.

8   (a)   Define the JIT production. State the pre-requisite to achieve JIT production.
    (b)   State merit and demerit of JIT production.

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