Code No: 2420305

SET- 1

IV B. Tech II Semester Regular Examinations, April/May 2009
PRODUCTION PLANNING & CONTROL
(Mechanical Engineering)

Time: 3 Hours

Max. Marks 80

Answer any FIVE questions
All questions carry equal marks
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1. (a) Discuss the objectives of Production Planning and Control.

    (b) What do you understand by Control phase? Explain the activities under this phase.

2. (a) What are the different demand patterns on which the sales forecasting is based? Explain.

    (b) Describe the Delphi method of sales forecasting.

3. (a) List and explain the different costs of inventory system.

    (b) The annual demand for an item is 36,000 units. The carrying cost is Rs.0.50 per unit per year. Ordering cost is Rs.25 per order, and the shortage cost is RS.15 per unit

    per year. Find the optimal values of:

    EOQ,   Maximum shortage quantity, Cycle time.

4. (a) Briefly explain the purpose and concept of Line of Balance.

    (b) What does the bill of materials structure mean? Explain by an example.

5. (a) Define the functions of Routing. Explain the concept of Route sheet.

    (b) Describe the different types of scheduling.

6. (a) Distinguish between single machine scheduling and flow shop scheduling.

    (b) Use graphical method to minimize the time needed to process the following jobs on the machines shown (for each machine, find the job which is to be scheduled first).

    Also calculate the total elapsed time to complete the jobs.

Job 1	Sequence	A	B	C	D	E
	Time (Hrs)	2	6	5	4	7
Job 2	Sequence	C	B	D	A	E
	Time (Hrs)	6	5	7	4	8

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7 (a) Distinguish between the Rank Positional Weight and COMSOAL algorithm for
   Assembly Line Balancing.

   (b) Describe the different aggregate planning strategies.

8 (a) Explain the various dispatching procedures followed in industry practice.

   (b) What are the types of follow up? Explain.

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SET- 2

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(Mechanical Engineering)

Time: 3 Hours   **Max. Marks 80**

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1. (a) Describe the elements of Production Control.

   (b) Explain the various functions of Production Planning and Control.

2. The following table represents the sales data (in hundreds of units) for an item:

Month	1	2	3	4	5	6	7	8	9	10	11	12
Sales	96	106	92	114	108	98	99	115	106	91	102	99

   (a) Use single exponential smoothing to forecast demand with α of 0.20 and an initial forecast of 100.00

   (b) Use trend adjusted exponential smoothing to forecast sales through period 13 for the following data. Use an α of 0.30, a β of 0.50, an initial base of 29.0 and a trend of 1.0

3. (a) What is ABC analysis? Explain by an example.

   (b) The annual demand of a product is 48,000 units. The average lead time is 3 weeks. The standard deviation of demand during the average lead time is 100 units/week. The ordering cost is Rs.500 per order. The cost of purchase of the product per unit is Rs.15. The cost of carrying per unit per year is 20% of the purchase price. The maximum delay in lead time is 2 weeks and the probability of this delay is 0.30. Assume a service level of 0.90. If P system is followed, find the reorder level.

4. The master production schedule to manufacture a certain item is shown in Table 1 below. The details of Bill of Materials along with EOQ and stock on hand for the final product and sub assemblies are shown in Table 2. Complete the Materials Requirement Plan for the different parts of the item shown in Table 2, and find what quantities of orders must be released, and when they should be released in order to satisfy the MPS.

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Table 1 : **Master Production Schedule**

Week	1	2	3	4	5	6	7	8
Demand	100		150	140	200	140		300

Table 2 : **Details of Bill of Materials**

Parts Required	Order Quantity	No. of Units	Lead Time (Weeks)	Stock on Hand
Fire extinguisher	300	1	1	150
Cylinder	450	1	2	350
Valve Assemblies	400	1	1	325
Valve	350	1	1	150
Valve Housing	450	1	1	350
Handle Bars	700	2	1	650

5. (a) What are the factors affecting the Routing procedure? Explain.

   (b) Differentiate between Loading and Scheduling with suitable examples.

6. (a) Discuss the use of Gantt Chart for scheduling purposes.

   (b) Eight jobs are to be processed on three machines A,B, and C in the same order

   ABCand the processing times (in hours) required for the jobs on the machines are

   shown

      below. Find the job sequence that minimizes the total processing time for all jobs.

Job	A	B	C	D	E	F	G	H
A	4	8	5	9	3	4	9	6
B	6	4	7	1	4	2	5	2
C	8	7	9	7	9	8	9	7

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7. (a) A line balancing analysis resulted in a precedence grouping as shown in the Table below. Find the balance efficiency, assuming the longest actual time is the cycle time.

Work centre	Activity Numbers	Actual Time (Min)
A	1,2	1.2
B	3,5,6	1.4
C	4,7	0.9
D	8,10,11	1.3
E	9	1.5

(b) What are the merits and demerits of the Transportation problem of method of aggregate planning?

8. (a) What is dispatching and what is the function of the dispatch list?

(b) Write a note on the applications of computers in production planning and control.

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1. (a) Would Operations Planning and Control in service industries be different from PPC in manufacturing industries? Discuss.

   (b) Discuss centralization and decentralization in the context of PPC.

2. (a) Discuss the general principles of forecasting.

   (b) A company used a 9-month moving average forecasting method to predict the inventory requirements of an item. The actual demand for the item is shown in the table below. Using the previous moving average data, convert to an exponential smoothing forecast for month 10.

Month	1	2	3	4	5	6	7	8	9
Demand	78	65	90	71	80	101	84	60	73

3. (a) Distinguish between ABC analysis and VED analysis.

   (b) Distinguish between the P and Q systems of inventory.

4. (a) Given the forecast requirements for end item Y shown in the table below, complete the Material Requirements Plan. Note that a scheduled receipt of 60 units is due in period 2 and a safety stock of 25 units is to be maintained. Lead time is 2 weeks, and the order quantity is 60 units.

Week		1	2	3	4	5	6	7	8	9	10
Gross requirements		20	20	20	30	20	20	20	25	20	35
Scheduled/Planned receipts			60								
On hand at the end of period	50										
Planned-order release											

   (b) Explain the basic principles of JIT manufacturing system.

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5. (a) What is the major function of the Bill of Materials? What happens if the BOM is inaccurate? Distinguish between an indented BOM and a single-level BOM.

(b) What is Scheduling? How is it different from Loading? Explain.

6. (a) State the assumptions in flow shop scheduling.

(b) A market research firm has 7 customer orders that must be processed sequentially through two activities X and Y. The estimated times (in hours) for the activities are as shown below. Use Johnson's rule to develop a schedule that would permit all the work to be completed in the minimum amount of time. Also find the total time required to process all the jobs.

	1	2	3	4	5	6	7
Activity X	5	7	2	1	8	3	16
Activity Y	4	9	7	2	2	9	5

7. Tasks A through I have the predecessor and time requirements as shown in the table below. The output ia to be 200 units per day, and the operating time is 450 minutes per day. Using the Most Successors rule to assign the tasks to work centres, and the longest work-time rule as a tie breaker,

(a) group the tasks into work centres, and

(b) compute the balance efficiency, idle time, and the balance delay.

Task	*Predecessor*	*Time*(Sec)
A	None	40
B	A	20
C	None	60
D	C	40
E	D	30
F	None	35
G	F	45
H	G	60
I	H	40
Total		370

8. (a) What are the types of follow up? Explain.

(b) What is dispatching and what is the function of the dispatch list?

SET- 4

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IV B. Tech II Semester Regular Examinations, April/May 2009
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(Mechanical Engineering)

Time: 3 Hours   **Max. Marks 80**

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****

1. (a) What are the main types of production systems? Explain.

  (b) Write a note on the organization of the PPC department.

2. (a) In what situations, the following forecasting techniques are well suited?

       (i) Market Research Technique   (ii) Trend line

   (b) A food processing company uses a moving average to forecast the next month's

      demand. Past actual demand (in units) is shown in the table below.

       (i)Compute a simple 5-month moving average to forecast the demand for the

          month 52.

       (ii)Compute a weighted 3-month moving average, where the weights are highest

          for the latest months, and descend in order of 3, 2, 1.

Month	43	44	45	46	47	48	49	50	51	52
Actual Demand	105	106	110	110	114	121	130	128	137	

3. (a) Discuss the various costs involved in the inventory management.

   (b) The annual demand of a product is 48,000 units. The average lead time is 3 weeks.

      The standard deviation of demand during the average lead time is 100 units/week.

      The ordering cost is Rs.500 per order. The cost of purchase of the product per unit

      is Rs.15. The cost of carrying per unit per year is 20% of the purchase price. The

      maximum delay in lead time is 2 weeks and the probability of this delay is 0.30.

      Assume a service level of 0.90. If Q system is followed, find the reorder level.

4. (a) Briefly explain the steps which are followed in a Kanban system.

   (b) What is ERP system? What are its benefits?

5. (a) Define Routing and explain the Routing Procedure.

   (b) Discuss Loading and Scheduling as an essential part of Production Control.

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6. (a) Distinguish between flow shop scheduling and job shop scheduling.

   (b) A machine operator has to perform three operations (turning, threading and knurling) on different jobs. The times required to perform these operations (in minutes) for each job is shown below. Determine the order in which the jobs are to be processed in order to minimize the total time required to turn out all the jobs.

Job	Time for Turning (Min)	Time for Threading (Min)	Time for Knurling (Min)
1	3	8	13
2	12	6	14
3	5	4	9
4	2	6	12
5	9	3	8
6	11	1	13

7. (a) What are the merits and demerits of the Transportation problem of method of aggregate planning?

   (b) Distinguish between the Rank Positional Weight and COMSOAL algorithm for Assembly Line Balancing.

8. (a) What are the activities of a Dispatcher? Explain.

   (b) Write a note on the applications of computers in production planning and control.