SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur– 603203.

DEPARTMENT OF MECHANICAL ENGINEERING

QUESTIONBANK

VIII SEMESTER

1909803 – PRODUCTION PLANNING AND CONTROL

Regulation–2019

Academic Year 2024-2025 (Even Semester)

Prepared by

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1909803 – PRODUCTION PLANNING AND CONTROL

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UNIT I- INTRODUCTION

Objectives and benefits of planning and control-Functions of production control-Types of production job- batch and continuous-Product development and design-Marketing aspect - Functional aspects-Operational aspect-Durability and dependability aspect aesthetic aspect. Profit consideration-Standardization, Simplification & specialization- Break even analysis-Economics of a new design.

PART-A (2 Marks)

Q.No.	Questions	BT Level	Competence
1.	Differentiate between scheduling and loading.	BT-1	Remembering
2.	Distinguish between dispatching and expediting.	BT-2	Understanding
3.	With a line sketch, explain the relationship between production planning and production control.	BT-2	Understanding
4.	How can you classify the production system?	BT-2	Understanding
5.	Contrast product simplification with product diversification.	BT-2	Understanding
6.	Define production planning and control.	BT-1	Remembering
7.	Write the objectives of PPC.	BT-1	Remembering
8.	List out the functions of dispatching.	BT-1	Remembering
9.	What are the three phases of production planning and control?	BT-1	Remembering
10.	What is a production system?	BT-1	Remembering
11.	Classify the types of production system.	BT-2	Understanding
12.	What are the objectives of product analysis?	BT-2	Understanding
13.	List the various factors that influence the product design.	BT-2	Understanding
14.	What is standardization and mention the benefits of standardization?	BT-1	Remembering
15.	What is simplification?	BT- 1	Remembering
16.	What is meant by routing and scheduling?	BT-1	Remembering
17.	What are the 4M's in planning?	BT-1	Remembering

18.	State the aims and advantages of standardization.	BT-1	Remembering
19.	What do you understand by break even analysis?	BT-1	Remembering
20.	Define Break Even Point.	BT-1	Remembering
21.	Write the significance of BEP.	BT-2	Understanding
22.	List out the managerial uses of break-even analysis.	BT-2	Understanding
23.	How are the plant layouts related to type of production system?	BT-1	Remembering
24.	Differentiate between product design and product development.	BT-2	Understanding
25.	List out the assumptions in Break-even analysis	BT-2	Understanding

	PART-B (13 Marks)			
Q.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	What do you understand by production planning and control? Discuss its main elements or functions.	13	BT-1	Remembering
2	Enumerate the activities involved in the production planning and control function under ten convenient points.	13	BT-2	Understanding
3	Compare production planning and production control with a neat block diagram.	13	BT-2	Understanding
4	Explain the phases of production planning and control.	13	BT-2	Understanding
5	Explain different types of production systems. Differentiate between them.	13	BT-2	Understanding
6	Explain the procedural steps in product design and product development.	13	BT-2	Understanding
7	Annual fixed costs at a small textile shop are Rs. 50,000 and variable costs are estimated at 50% of the Rs. 40 / unit selling price. (a) Find the BEP. (b) What profit (or loss) would result from a volume of 3250 units?	13	BT-3	Applying
8	(i) Enumerate job shop and batch production systems.	6	BT-2	Understanding
	(ii) Enumerate mass and continuous production systems.	7	BT-2	Understanding
9	With the help of simple flow diagram explain various functions of production planning and control.	13	BT-2	Understanding
10	(i) List out the limitations of break even analysis.	6	BT-2	Understanding

<table>
<tr><td></td><td>(ii) Enumerate the margin of safety and angle of incidence.</td><td>7</td><td>BT-2</td><td>Understanding</td></tr>
<tr><td>11</td><td>Explain the durability, dependability and aesthetic aspects of product design.</td><td>13</td><td>BT-4</td><td>Analysing</td></tr>
<tr><td>12</td><td>The fixed costs for the year 2000-01 are Rs. 600000 variable cost per unit is Rs. 40. Each unit sells at Rs. 160,determine (i) breakeven point in terms of physical units and in terms of rupees (ii) if a sales volume of 5500 units has been expected, then what will the profit earned (iii) if a profit target of Rs. 120000 has been budgeted compute the number of units to be sold. (iv) If the company sells 6500 units, calculate the margin of safety and profit.</td><td>13</td><td>BT-4</td><td>Analysing</td></tr>
<tr><td>13</td><td>Madison industries has the following data on costs at two volumes of production for a product that sell for Rs. 50 (a) construct a two volume , break even chart. (b) compute the variable cost, the contribution and the BEP (c) using the contribution from (b), estimated the profit at a volume of 8000 units
<table>
<tr><th>Units</th><th>Labour (Rs.)</th><th>Material (Rs.)</th><th>Overhead (Rs.)</th><th>Other FC (Rs.)</th><th>Total (Rs.)</th></tr>
<tr><td>6000</td><td>60000</td><td>36000</td><td>54000</td><td>80000</td><td>230000</td></tr>
<tr><td>10000</td><td>.100000</td><td>60000</td><td>60000</td><td>80000</td><td>300000</td></tr>
</table></td><td>13</td><td>BT-4</td><td>Analysing</td></tr>
<tr><td>14</td><td>The annual fixed costs of a product are known to be Rs.3 lakhs and the annual net profit Rs. 60,000, the average monthly sale being 1000 units. A new design is contemplated involving the expenditure for preparation amounting to Rs. 1, 20,000 to be returned in two years. It is expected that with new production methods the P/V ratio may be increased by 5 per cent what should the annual sales figure for the new design be
(i) So that the same net profit will be realized
(ii) So that in addition to this profit a yield of 10 % on the capital invested will be obtained?</td><td>13</td><td>BT-4</td><td>Analysing</td></tr>
</table>

15	State the role of product analysis in the design and development of a product? Explain the step by step process in designing a product.	13	BT-4	Analysing
16	Explain the functional and operational aspects of product design.	13	BT-4	Analysing
17	ABC Ltd is engaged in the manufacture of chairs. The cost of land, building, and machinery is Rs.1, 00,000. The cost of wood and labour for each chair is Rs.40 and the selling price is Rs.60. Find out the minimum number of chairs to be manufacture so that neither profit not loss is incurred by ABC limited.	13	BT-4	Analysing
18	A firm has annual fixed cost of Rs.2.1 million and variable cost of Rs.6 per unit. It is considering an additional investment of Rs.9, 00,000 that will increase the fixed cost by Rs.1, 19,000 per year and will increase the contribution by Rs.1.00 per unit. No change is anticipated in the sales volume or sales price, which is Rs.10 per unit. What is the new BEP if the new investment is made?	13	BT-4	Analysing

	PART-C (15 Marks)			
S.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	A manufacture industry of annual fixed cost of Rs. 60,000 and variable cost is 60% of the selling price of a product. The selling price of the product is Rs. 50/units. Find the Breakeven point, and profit would be result from a volume of 4000 units?	15	BT-5	Evaluating
2	Write about economics of a new design for a product.	15	BT-5	Evaluating
3	You own a factory which manufactures steel furniture as and when you receive orders. Describe the steps you would follow in planning and control the production.	15	BT-6	Create

4	For a product, the annual fixed cost is Rs.2,00,000, while the annual profit is Rs.40,000 and average monthly sales is 820 units. A new design is being planned with investment of Rs80,000 to be returned in 2 years. With the new design, the P/V ratio shall increase by 5%. Calculate the annual sales figure for the new design under two different conditions, as follows: (i) Net profit remains constant; (ii) In addition to the above profit, a yield of 10% on the capital invested will be obtained.	15	BT-5	Evaluating
5	Sales forecast indicates that a minimum of 5000 units will be sold each year for the next 3 years. Two design modifications are being considered for the product. One modification would increase fixed cost by Rs.28,000 per year but it will reduce variable cost by Rs.8 per unit. The other modification would increase fixed cost by Rs.7000 per year and reduce variable cost by Rs.6 per unit. Current variable cost is Rs.30 per unit. (a) Which design modification should be adopted? (b) At what point you will be indifferent abut alternatives?	15	BT-5	Evaluating

UNIT II -WORK STUDY

Method study, basic procedure-Selection-Recording of process-Critical analysis, Development-Implementation-Micro motion and memo motion study–work measurement-Techniques of work measurement-Time study-Production study-Work sampling-Synthesis from standard data-Predetermined motion time standards.

PART-A (2 Marks)

Q.No.	Questions	BT Level	Competence
1.	What is method study? State three different levels in method study.	BT-2	Understanding
2.	List the objectives of Motion study.	BT-2	Understanding
3.	What is Motion study?	BT-2	Understanding
4.	List out the various techniques of method study.	BT-2	Understanding
5.	What is predetermined motion time studies?	BT-2	Understanding
6.	Distinguish Motion and Memo motion studies.	BT-1	Remembering
7.	State about critical analysis.	BT-2	Understanding
8.	List the objectives of work study.	BT-1	Remembering
9.	What are Therbligs?	BT-1	Remembering
10.	Name the few charts used in motion studies.	BT-2	Understanding
11.	What is meant by Ergonomics?	BT-2	Understanding
12.	How idle time affects productivity?	BT-2	Understanding
13.	How rest pauses improves productivity?	BT-2	Understanding
14.	State about Predetermined Time studies(PDTS)	BT-2	Understanding
15.	Distinguish Motion studies and predetermined motion studies(PDMS).	BT-2	Understanding
16.	State how Ergonomics affects the productivity.	BT-2	Understanding
17.	What is Work measurement?	BT-1	Remembering
18.	Define work sampling.	BT-1	Remembering
19.	Write about Time study.	BT-2	Understanding
20.	Why allowances have to be added to observed time?	BT-1	Remembering
21.	What are multiple activity charts?	BT-1	Remembering
22.	What is SIMO chart?	BT-1	Remembering

23.	Give any five therbligs with symbol.	BT-1	Remembering
24.	Differentiate between cycle graph and chronocycle graph.	BT-1	Remembering
25.	Differentiate between micromotion and memomotion study.	BT-1	Remembering

	PART-B (13 Marks)			
Q.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	Discuss in detail about the objectives of method study.	13	BT-1	Remembering
2	Explain the procedural steps involved in conducting method study with suitable example.	13	BT-2	Understanding
3	Discuss various recording techniques used in method study.	13	BT-3	Applying
4	Describe in detail about production study followed in production industry.	13	BT-2	Understanding
5	Explain the types of allowances used in calculating normal time along with a neat sketch.	13	BT-3	Applying
6	Explain in detail about Predetermined time and motion studies.	13	BT-5	Evaluating
7	Time study engineer took 8 observations of an element. Each observation gives the following readings to complete this element 5, 4, 6, 3, 5, 6, 6 and 4 minutes. Determine the number of observations required for a 95% confidence level and an accuracy ± 5%.	13	BT-3	Applying
8	What are the methods used in recording the time for an element Using stop watch? Explain.	13	BT-2	Understanding
9	Explain how use of work study leads to higher productivity in a manufacturing unit.	13	BT-2	Understanding
10	(i) Write short notes on the symbols used in process chart with neat diagram.	6	BT-2	Understanding
	(ii) What are effective and ineffective Therbligs? Explain with neat diagram.	7	BT-2	Understanding
11	What are the various symbols of process chart? Explain them briefly.	13	BT-1	Remembering
12	Explain the objectives, concept, procedure, advantages and disadvantages of micromotion study.	13	BT-2	Understanding

13	Define time study. List down the various steps in conducting a stop watch time study.	13	BT-2	Understanding
14	Tabulate the questions used for critical analysis in work study.	13	BT-2	Understanding
15	Explain about Work Measurement in detail with suitable example.	13	BT-2	Understanding
16	Construct a multiple activity chart for threading of bolt in the production shop of a factory?	13	BT-2	Understanding
17	What is a Flow diagram? Construct a flow diagram for gear Manufacturing plant.	13	BT-2	Understanding
18	Distinguish between cumulative timing and fly back timing.	13	BT-2	Understanding

<table>
<tr><td></td><td colspan="4">PART-C (15 Marks)</td></tr>
<tr><td>S.No</td><td>Questions</td><td>Marks</td><td>BT Level</td><td>Competence</td></tr>
<tr><td>1</td><td>A job involves six elements with the following observed times and performance ratings. Calculate (i) Normal time for each elements and (ii) Standard time per piece.
<table>
<tr><th>Element</th><th>Observed Time (min)</th><th>Performance rating (%)</th></tr>
<tr><td>1.</td><td>0.30</td><td>80</td></tr>
<tr><td>2.</td><td>0.10</td><td>90</td></tr>
<tr><td>3.</td><td>0.60</td><td>95</td></tr>
<tr><td>4.</td><td>0.15</td><td>100</td></tr>
<tr><td>5.</td><td>0.25</td><td>90</td></tr>
<tr><td>6.</td><td>1.15</td><td>85</td></tr>
</table></td><td>15</td><td>BT-4</td><td>Analyzing</td></tr>
<tr><td>2</td><td>A time study was conducted on a work consisting of five elements. Stop watch readings in 50th of a minute are given below using cumulative time method along with rating factors. Calculate the standard time if allowance is 13%.</td><td>15</td><td>BT-4</td><td>Analyzing</td></tr>
</table>

	<table><tr><th rowspan="2">Element</th><th colspan="5">Stop watch readings</th><th rowspan="2">Rating</th></tr><tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr><tr><td>A1</td><td>18</td><td>85</td><td>160</td><td>265</td><td>331</td><td>75</td></tr><tr><td>B1</td><td>30</td><td>92</td><td>182</td><td>287</td><td>352</td><td>125</td></tr><tr><td>C1</td><td>43</td><td>101</td><td>203</td><td>299</td><td>368</td><td>98</td></tr><tr><td>D1</td><td>52</td><td>125</td><td>227</td><td>305</td><td>382</td><td>97</td></tr><tr><td>E1</td><td>72</td><td>140</td><td>245</td><td>312</td><td>398</td><td>92</td></tr></table>			
3	The time taken for 4 cycles of an operation using stop watch are given below: Calculate the standard time for operation if: a) Elements 2 and 4 are machine elements. b) For remaining elements, operator is rated at 80% c) Total allowance are 12 %of the normal time. <table><tr><th rowspan="2">Element</th><th colspan="4">Cycle time in minutes</th></tr><tr><th>1</th><th>2</th><th>3</th><th>4</th></tr><tr><td>1</td><td>2.5</td><td>2.6</td><td>2.4</td><td>2.7</td></tr><tr><td>2</td><td>1.2</td><td>1.6</td><td>1.3</td><td>1.5</td></tr><tr><td>3</td><td>0.5</td><td>0.6</td><td>0.4</td><td>0.6</td></tr><tr><td>4</td><td>3.5</td><td>3.1</td><td>3.2</td><td>3.4</td></tr><tr><td>5</td><td>1.3</td><td>1.2</td><td>1.3</td><td>1.1</td></tr></table>	15	BT-5	Evaluating
4	Discuss the techniques to reduce work content and various concepts of work content.	15	BT-5	Evaluating
5	A time study man has taken five observations as follows on a particular stop watch reading during machining a job with a view to finding out the time value within ±5 percent precision and 95 percent confidence level. Find the number of observation required. Observations are 10, 6, 8, 7 and 9.	15	BT-4	Analyzing

UNIT- III -PRODUCT PLANNING AND PROCESS PLANNING

Product planning-Extending the original product information-Value analysis-Problems in lack of product planning-Process planning and routing-Pre requisite information needed for process planning-Steps in process planning -Quantity determination in batch production-Machine capacity, balancing-Analysis of process capabilities in a multi-product system.

PART-A (2 Marks)

Q.No.	Questions	BT Level	Competence
1.	What is product planning?	BT-1	Remembering
2.	What is the purpose of feasibility study in relation to product planning?	BT-1	Remembering
3.	List the activities of advanced product planning.	BT-2	Understanding
4.	List the information that can be obtained from the system operation concept.	BT-2	Understanding
5.	What are the various steps in process planning?	BT-2	Understanding
6.	What is value analysis?	BT-1	Remembering
7.	Differentiate primary and secondary functions with respect to value analysis.	BT-2	Understanding
8.	Mention at least six uses of value analysis.	BT-1	Remembering
9.	What are the types of value?	BT-1	Remembering
10.	What is meant by process planning?	BT-2	Understanding
11.	Differentiate between process planning and product planning.	BT-2	Understanding
12.	Draw a simple stock control model with and without buffer stock.	BT-2	Understanding
13.	List the factors affecting the selection of batch size.	BT-2	Understanding
14.	What are the criteria for the selection of batch size?	BT-2	Understanding
15.	List the information that can be obtained from the system maintenance concept.	BT-2	Understanding

16.	What are the information required for machine loading?	BT-2	Understanding
17.	Define line balancing.	BT-1	Remembering
18.	What is meant by machine loading?	BT-1	Remembering
19.	If the cycle time of the product is 3 min. Determine the machine output per hour.	BT-2	Understanding
20.	Distinguish between value analysis and value engineering.	BT-1	Remembering
21.	What is meant by machine balancing?	BT-2	Understanding
22.	If the cycle time of the product is 3min, determine the machine output per hour.	BT-2	Understanding
23.	What is the information required for machine loading?	BT-2	Understanding
24.	What is the use of master production program?	BT-2	Understanding
25.	What is the purpose of machine loading chart?	BT-2	Understanding

	PART-B (13 Marks)			
Q.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	Explain the importance of process planning with reference to production control. Discuss the activities involved in process planning.	13	BT-1	Remembering
2	What do you mean by machine balancing? Also explain the effect of balancing on number of machines required with an illustration.	13	BT-2	Understanding
3	Explain the analysis of process capabilities in a multi-product system.	13	BT-3	Applying
4	Summarize the pre-requisite information needed for process planning with the steps involved in process planning.	13	BT-2	Understanding
5	Write short notes on Quantity determination in batch production.	13	BT-3	Applying
6	Explain the procedure for capacity planning of single and multi-stage system.	13	BT-3	Applying
7	Explain the steps involved in the standard procedure for process planning. Also explain various types of process	13	BT-2	Understanding

<table>
<tr><td></td><td>planning method.</td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">8</td><td>Explain how the stock control of batch production is performed by following consideration
(a) Without buffer stock.</td><td>6</td><td>BT-3</td><td>Applying</td></tr>
<tr><td>(b) With buffer stock.</td><td>7</td><td>BT-2</td><td>Understanding</td></tr>
<tr><td>9</td><td>What is meant by product planning? Explain in details the various steps involved in the product planning process.</td><td>13</td><td>BT-5</td><td>Evaluating</td></tr>
<tr><td>10</td><td>Explain the various phases of value engineering?</td><td>13</td><td>BT-2</td><td>Understanding</td></tr>
<tr><td>11</td><td>What do you mean by minimum- cost batch size? Also derive an expression for it.</td><td>13</td><td>BT-1</td><td>Remembering</td></tr>
<tr><td>12</td><td>What is meant by machine loading? Also enumerate the various methods to the cycle time to a minimum.</td><td>13</td><td>BT-1</td><td>Remembering</td></tr>
<tr><td>13</td><td>Explain how production quantity in batch production is determined.</td><td>6
7</td><td>BT-2</td><td>Understanding</td></tr>
<tr><td>14</td><td>What is value analysis? Describe the basic steps involved in the value analysis.</td><td>13</td><td>BT-2</td><td>Understanding</td></tr>
<tr><td>15</td><td>State the ten commandments of value analysis.</td><td>13</td><td>BT-2</td><td>Understanding</td></tr>
<tr><td>16</td><td>Explain what are the responsibilities of a process planning engineer?</td><td>13</td><td>BT-2</td><td>Understanding</td></tr>
<tr><td>17</td><td>Explain value analysis and value engineering.</td><td>13</td><td>BT-2</td><td>Understanding</td></tr>
<tr><td>18</td><td>Two products A and B are produced in a plant, which have to process through five stages. The total operation time at each stage for each product, when employed for one product only, is given below.
<table>
<tr><th>Stage</th><th>Product A (min/Unit)</th><th>Product B (min/Unit)</th></tr>
<tr><td>I</td><td>0.3</td><td>0.5</td></tr>
<tr><td>II</td><td>0.4</td><td>0.4</td></tr>
<tr><td>III</td><td>0.6</td><td>-</td></tr>
<tr><td>IV</td><td>0.5</td><td>0.375</td></tr>
<tr><td>V</td><td>-</td><td>0.3</td></tr>
</table>
</td><td>13</td><td>BT-2</td><td>Understanding</td></tr>
</table>

<table>
<tr><td></td><td colspan="5">PART-C (15 Marks)</td></tr>
<tr><td>S.No</td><td>Questions</td><td>Marks</td><td>BT Level</td><td>Competence</td></tr>
<tr><td>1</td><td>With a suitable example create a process planning sheet and route sheet.</td><td>15</td><td>BT-4</td><td>Analyzing</td></tr>
<tr><td>2</td><td>Classify CAPP and explain each type in detail with flow chart.</td><td>15</td><td>BT-4</td><td>Analyzing</td></tr>
<tr><td>3</td><td>Explain the phrase Extending the original product information with suitable example.</td><td>15</td><td>BT-4</td><td>Analyzing</td></tr>
<tr><td>4</td><td>A machining centre has a product consist of 5 stages in production sequence. Below table represent time and machine time. Calculate the i.Total operation time, ii. Machine output, iii. Efficiency of the machine.
<table>
<tr><td>Operations</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>Preparation time in min</td><td>1.5</td><td>1.4</td><td>1.3</td><td>1</td><td>2</td></tr>
<tr><td>Machine time in Min</td><td>2</td><td>2.5</td><td>2.2</td><td>3</td><td>5</td></tr>
</table></td><td>15</td><td>BT-4</td><td>Analyzing</td></tr>
<tr><td>5</td><td>What do you mean by machine balancing? Also explain the effect of balancing on number of machines required with an illustration.</td><td>15</td><td>BT-4</td><td>Analyzing</td></tr>
</table>

UNIT- IV - PRODUCTION SCHEDULING

Production Control Systems-Loading and scheduling-Master Scheduling-Scheduling rules-Gantt charts-Perpetual loading-Basic scheduling problems-Line of balance–Flow production scheduling-Batch production scheduling -Product sequencing–Production Control systems-Periodic batch control -Material requirement planning kanban–Dispatching-Progress reporting and expediting-Manufacturing lead time-Techniques for aligning completion times and due dates.

PART-A (2 Marks)

Q.No.	Questions	BT Level	Competence
1.	List the key functions of the production scheduling and control.	BT-2	Understanding
2.	List the rules for priority sequencing.	BT-2	Understanding
3.	Show the various recording methods for progressing purpose.	BT-2	Understanding
4.	Name the various MRP output reports.	BT-2	Understanding
5.	Recall the functions of expediting.	BT-2	Understanding
6.	List some of the commonly used forms in dispatching.	BT-1	Remembering
7.	Illustrate the purpose of operation program chart.	BT-2	Understanding
8.	Summarize any six benefits of implementing MRP system.	BT-1	Remembering
9.	Compare aggregate planning and master scheduling.	BT-1	Remembering
10.	Interpret the data required for production scheduling.	BT-2	Understanding
11.	Identify the purpose of (a) work load chart and (b) Scheduling chart.	BT-3	Applying
12.	What is MRP? List the various inputs required for MRP.	BT-3	Applying
13.	Select any six benefits of implementing MRP system.	BT-2	Understanding
14.	Analyze the purpose of the master production schedule.	BT-1	Remembering
15.	Examine the functions of dispatching.	BT-2	Understanding

16.	Sate the steps in Johnson's Algorithm for solving sequencing problems of many number of jobs and 4 machines.	BT-1	Remembering
17.	Compare master Scheduling and EBQ Scheduling.	BT-1	Remembering
18.	Explain scheduling? What are the objectives of scheduling?	BT-1	Remembering
19.	List the use of Gantt charts and objective charts.	BT-1	Remembering
20.	What do you mean by line-of-balance? What are its uses?	BT-1	Remembering
21.	Differentiate between aggregate planning and master scheduling.	BT-1	Remembering
22.	What do you mean by loading?	BT-1	Remembering
23.	What is scheduling? What are the objectives?	BT-1	Remembering
24.	What do you mean by perpetual scheduling?	BT-1	Remembering
25.	What is meant by product sequencing?	BT-1	Remembering

	PART-B (13 Marks)			
Q.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	What is progressing? Explain its functions? Also write short notes on 'recording progress'.	13	BT-1	Remembering
2	What are Gantt charts? Explain their types? How are they constructed?	13	BT-2	Understanding
3	Explain how Johnson's rule can be used for scheduling n jobs on three machines.	13	BT-3	Applying
4	Explain the procedure by which scheduling 2 jobs in m machines can be done with suitable example.	13	BT-2	Understanding
5	Discuss the concept, inputs, characteristics, working, outputs and benefits of MRP?	13	BT-3	Applying
6	What are the functions of dispatching? Explain the various documents raised by the dispatcher.	13	BT-5	Evaluating
7	Explain the procedure for developing master production schedule.	13	BT-2	Understanding
8	Write short notes on: (a) Aggregate run-out method of batch scheduling	7	BT-3	Applying
	(b) Line-of-balance method	6	BT-2	Understanding

<table>
<tr><td>9</td><td>What is perpetual scheduling? Explain the steps in making perpetual schedule.</td><td>13</td><td>BT-2</td><td>Understanding</td></tr>
<tr><td>10</td><td>The table below gives the data on current inventory, production lot sizes, standards hours per unit and the forecast of demand for all items required for a product. Determine the sequence of production using the aggregate run-out (AROT) method. The available production capacity is 320 hours. Also analyse the effect of capacity on the schedule.
<table>
<tr><td>Item</td><td>Standard hours per unit</td><td>Lot size</td><td>Forecast demand/ week</td><td>Current inventi on</td><td>Machine hour per order</td></tr>
<tr><td>A</td><td>0.20</td><td>200</td><td>70</td><td>200</td><td>40</td></tr>
<tr><td>B</td><td>0.40</td><td>300</td><td>100</td><td>240</td><td>120</td></tr>
<tr><td>C</td><td>0.30</td><td>200</td><td>80</td><td>260</td><td>60</td></tr>
<tr><td>D</td><td>0.40</td><td>400</td><td>120</td><td>160</td><td>160</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>380</td></tr>
</table></td><td>13</td><td>BT-2</td><td>Understanding</td></tr>
<tr><td>11</td><td>Two major parts P1 and P2 for a product require processing through five machine centres. The technological sequence of these parts on the six machines and the manufacturing times on each machine are given below.
<table>
<tr><td colspan="2">Part P1</td><td colspan="2">Part P2</td></tr>
<tr><td>Sequence of machines</td><td>Time(hours)</td><td>Sequence of machines</td><td>Time(hours)</td></tr>
<tr><td>A</td><td>3</td><td>B</td><td>5</td></tr>
<tr><td>B</td><td>4</td><td>C</td><td>4</td></tr>
<tr><td>C</td><td>2</td><td>A</td><td>3</td></tr>
<tr><td>D</td><td>6</td><td>D</td><td>2</td></tr>
<tr><td>E</td><td>2</td><td>E</td><td>6</td></tr>
</table></td><td>13</td><td>BT-1</td><td>Remembering</td></tr>
<tr><td>12</td><td>A scheduler ha four jobs that can be done on any of four machines with respective times (minutes) as shown in table below. Determine the allocation of jobs to machines that will result in minimum time.
<table>
<tr><td rowspan="2">Jobs</td><td colspan="4">Machine</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>A</td><td>5</td><td>6</td><td>8</td><td>7</td></tr>
<tr><td>B</td><td>10</td><td>12</td><td>11</td><td>7</td></tr>
</table></td><td>13</td><td>BT-1</td><td>Remembering</td></tr>
</table>

	C	10	8	13	6			
	D	8	7	4	3			
13	Five jobs are to be processed on three machines the processing times in hours are given below. Find the optimal sequence of jobs so that total elapsed time is minimised. **Job** / **J1** / **J2** / **J3** / **J4** / **J5** **A** 5 7 6 9 5 **B** 2 1 4 5 3 **C** 3 7 5 6 7					13	BT-2	Understanding
14	Processing time of five jobs on two machines are given below. Using Johnson's rule, schedule these jobs. Also find the minimum total flow time. **Machines** / **Time required for job (Hours)**: **A** **B** **C** **D** **E** **Machine M1** 5 4 8 7 6 **Machine M2** 3 9 2 4 10					13	BT-2	Understanding
15	Choose five jobs in waiting for setting processed on a machine. Their sequence of arrival, processing time and due-date are given in the table below. Job(sequence of arrival) / Processing time (days) / Due date(days from hence) A 4 6 B 5 7 C 3 8 D 7 10 E 2 3 Schedule the job using FCFS, SPT, Due date, LCFS, STR and random rules. Compare the result.					13	BT-2	Understanding
16	Examine six jobs that are processed on two machines A and B. The job is processed in sequence so that B should follow A. Determine the optimal order in which the jobs should be sequenced. Also draw Gantt chart.					13	BT-2	Understanding

Job	1	2	2	4	5	6
Processing time in M/c A(hrs)	3	5	4	7	1	3
Processing time in M/c B(hrs)	2	6	2	1	4	6

17	Four different jobs are to be done on 4 different machines. The matrix below gives the cost (in rupees) of producing each job (i) on each one of the machines (j). How should the job be assigned to the machine so that the total cost is minimum.	13	BT-2	Understanding

jobs	Machines			
	M1	M2	M3	M4
J1	5	7	11	6
J2	8	5	9	6
J3	4	7	10	7
J4	10	4	8	3

18	Two jobs J1 and J2 are to be processed on five machines M1,M2,.....,M5.The processing time and job sequences are as follows:	13	BT-2	Understanding

Job 1:

Machine Sequence	M1	M2	M3	M4	M5
Process time(min)	2	5	6	6	7

Job 2:

Machine Sequence	M3	M1	M4	M5	M2
Process time(min)	5	6	4	3	7

<table>
<tr><th></th><th colspan="4">PART-C (15 Marks)</th></tr>
<tr><th>S.No</th><th>Questions</th><th>Marks</th><th>BT Level</th><th>Competenc</th></tr>
<tr><td>1</td><td>Determine the total completion time, Average completion time and average lateness of the jobs using First Comes First Serve, Earlier Due Date, Last come first serve, and Slack Time Remaining.
<table>
<tr><th>Job Sequence</th><th>Due Date in Days</th><th>Processing Time in Days</th></tr>
<tr><td>A</td><td>6</td><td>8</td></tr>
<tr><td>B</td><td>5</td><td>6</td></tr>
<tr><td>C</td><td>8</td><td>7</td></tr>
<tr><td>D</td><td>7</td><td>9</td></tr>
<tr><td>E</td><td>4</td><td>6</td></tr>
<tr><td>F</td><td>5</td><td>5</td></tr>
</table></td><td>15</td><td>BT-4</td><td>Analyzin</td></tr>
<tr><td>2</td><td>There are five types of jobs needs to go through two machine centers named A and B. Find the optimum sequence of jobs using Johnson's rule.
<table>
<tr><th>Job</th><th>Machine center A in Hrs</th><th>Machine center B in Hrs</th></tr>
<tr><td>A</td><td>3.2</td><td>4.2</td></tr>
<tr><td>B</td><td>4.7</td><td>1.5</td></tr>
<tr><td>C</td><td>2.2</td><td>5.0</td></tr>
<tr><td>D</td><td>5.8</td><td>4.0</td></tr>
<tr><td>E</td><td>3.1</td><td>2.8</td></tr>
</table></td><td>15</td><td>BT-4</td><td>Analyzin</td></tr>
<tr><td>3</td><td>Explain the various charts used in LOB.</td><td>15</td><td>BT-4</td><td>Analyzin</td></tr>
<tr><td>4</td><td>Discuss Gannt Charts with examples.</td><td>15</td><td>BT-4</td><td>Analyzin</td></tr>
<tr><td>5</td><td>Explain any six priority rules used for job sequencing with example.</td><td>15</td><td>BT-2</td><td>Understanc</td></tr>
</table>

UNIT- V - INVENTORY CONTROL AND RECENT TRENDS IN PPC

Inventory control-Purpose of holding stock-Effect of demand on inventories-Ordering procedures. Two bin system-Ordering cycle system-Determination of Economic order quantity and economic lot size-ABC analysis-Recorder procedure-Introduction to computer integrated production planning systems-elements of JUST IN TIME SYSTEMS-Fundamentals of MRP II and ERP.

PART-A (2 Marks)

Q.No.	Questions	BT Level	Competence
1.	Define the terms inventory and inventory control.	BT-1	Remembering
2.	Name the different types of inventories.	BT-1	Remembering
3.	Mention at least four reasons for keeping inventory.	BT-1	Remembering
4.	Define the following term (a) lead time (b) re-order point.	BT-2	Understanding
5.	When do you use ABC analysis?	BT-2	Understanding
6.	List the "seven wastes" that becomes the target of elimination in JIT process.	BT-1	Remembering
7.	Differentiate between pull system and push system.	BT-2	Understanding
8.	Interpret P system and Q system.	BT-1	Remembering
9.	Compare One bin system in P model with two bin system in Q model.	BT-1	Remembering
10.	Differentiate between anticipation and fluctuation inventories.	BT-2	Understanding
11.	Identify any four objectives of inventory control.	BT-3	Applying
12.	Choose any six inventory control techniques	BT-3	Applying
13.	What is meant by ERP? Identify any four ERP packages that are widely used in India	BT-2	Understanding
14.	Compare Excess Stock and Stock out situations.	BT-2	Understanding
15.	Distinguish between Independent and Dependent demand.	BT-2	Understanding
16.	Examine the cost that are included in procurement cost and Inventory carrying cost.	BT-2	Understanding
17.	Explain fixed- order quantity model?	BT-1	Remembering
18.	What is the use of kanban in Production control system?	BT-1	Remembering

19.	Discuss about i)MRP II ii) EOQ iii) JIT	BT-2	Understanding
20.	Contrast lot size inventories with transportation inventories	BT-1	Remembering
21.	Differentiate between anticipation and fluctuation inventories.	BT-1	Remembering
22.	Contrast lot size inventories with transportation inventories.	BT-1	Remembering
23.	Mention at least four reasons for keeping an inventory.	BT-1	Remembering
24.	List any four objectives of inventory control.	BT-1	Remembering
25.	What are inventory costs?	BT-1	Remembering

	PART-B (13 Marks)			
Q.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	What do you understand by inventory control? Explain the purpose of maintaining inventory in any production unit.	13	BT-1	Remembering
2	List and explain different types of costs in inventory system.	13	BT-2	Understanding
3	What is EOQ? Derive the expression for EOQ when the demand of the item is uniform, the production rate is infinite and no stock-out are allowed.	13	BT-3	Applying
4	Explain the terms: (a) Lead time, (b) stock out, (c) buffer stock and (d) inventory carrying cost.	13	BT-2	Understanding
5	Distinguish between in-process inventory, safety stock inventory, and seasonal inventory.	13	BT-3	Applying
6	Explain in detail the fixed-order quantity inventory model? Also list merit, demerit and suitability of this model.	13	BT-5	Evaluating
7	Describe the fixed-period quantity inventory model? Also compare and contrast P-system with Q-system.	13	BT-2	Understanding
8	The annual demand for an item is 3200 units. The unit cost is Rs.6 and the inventory carrying charges are estimated as 25%per annum. If the cost of one procurement is Rs150, Determine (i)Economic Order Quantity, (ii)Number of orders per year, (iii)Time between two consecutive orders (iv)Optimal cost	13	BT-3	Applying

9	Explain selective control of inventory and explain various types.	13	BT-2	Understanding
10	Explain ABC analysis? Explain its significance in the inventory control with suitable example	13	BT-2	Understanding
11	Compare and contrast a pull production system and push production System.	13	BT-1	Remembering
12	Examine the concept of JIT. How does it help the manufacturing system to improve productivity?	13	BT-1	Remembering
13	Discuss the various basic elements of JIT that must be addressed for successful JIT implementation.	13	BT-2	Understanding
14	Monthly consumption of an item is 500 units. The price per unit is Rs.25. Inventory carrying cost is 16 percent and ordering cost is Rs 50 per order. Lead time of 1 month stock. For a ROL i.e., Q-system determine (i) Re-Order Quantity (ii) Minimum Level (iii) Re-order level (iv) Maximum level (v) Average inventory	13	BT-2	Understanding
15	Discuss the important modules in ERP software.	13	BT-2	Understanding
16	Explain the methodology adopted in implementing ERP.	13	BT-2	Understanding
17	Write an engineering brief about computer integrated production planning and control.	13	BT-2	Understanding
18	Describe a two-card Kanban system with example.	13	BT-2	Understanding

	PART-C (15 Marks)			
S.No	**Questions**	**Marks**	**BT Level**	**Competence**
1	A manufacturing has to supply his customer 3600 units of his product per year. Shortages are not permitted. Inventory carrying cost amount Rs.12/unit/annum. The set up cost run is Rs.80. Find (i) Economic order quantity (ii) Optimum number of orders per annum (iii) Average annual inventory cost and (iv) Optimum period of supply per optimum order.	15	BT-4	Analyzing
2	The annual demand for an item is 4200 unit. The unit cost is Rs.9 and inventory carrying charges are estimated as 30% per annum. It the cost of one procurement is Rs.120,	15	BT-4	Analyzing

	determine, (i) Economic order quantity (ii) No. of orders per year, (iii) Time between two connective orders and (iv) Optimal cost.			
3	Discuss the recent trends in production planning and control of manufacturing industries.	15	BT-4	Analyzing
4	How will you determine minimum-cost batch size of production? Explain in detail with graph.	15	BT-4	Analyzing
5	Beta industry estimates that it will sell 10,000 units of its product for the forthcoming year. The ordering cost is Rs.36 per order and the carrying cost per unit per year is 9% of the purchase price per unit which is Rs.2. Determine: (i) EOQ (ii) Optimal number of orders to be placed per annum (iii)Minimum total cost of inventory per annum.	15	BT-4	Analyzing

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