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## PRODUCTION PLANNING AND CONTROL (ME854PE) COURSE PLANNER

### **Objective & Relevance:**

Production is an organized activity carried out by manufacturing organization with basic objective of converting raw materials into useful products. To do so effectively and efficiently, before starting the work of actual production, production planning should be done in order to anticipate possible difficulties and decide in advance as to how the production should be carried out in the best and economical way.

Production Planning and Control (PPC) is the process of planning the production in advance, setting the exact route of each item, fixing starting and finishing dates for each item, authorizing shop activity by release of production order to shops and lastly to follow-up the progress of production and expediting as required. The principle of production planning and control can be stated in a simple statement as, “First plan the work, and then work the plan”. Since mere planning of production is not sufficient, the management should take all possible steps to see that project or plan chalked by the planning department are properly adhered to and control over production is exercised in order to meet the standards set.

Planning and control are two basic and interrelated managerial functions. Planning is the preparation activity while control is the post-operation function. Planning sets the objectives, goals, targets on the basis of available resources with their given constraints, while control involves assessment of the performance, based on standards set in advance during planning. The controlling is done by comparing the actual performance with the set standards and deviations are ascertained and analyzed and rectification is carried out.

### **Course purpose:**

Production Planning and Control departments’ objective is to produce goods and services of the right quality, in the right quantities, according to the time schedule and at a minimum cost by using the best and least expensive methods. As a prospective executive one needs to understand methods, plans, various techniques that are essential to operate an organization effectively and efficiently. For this purpose, one must have the knowledge of production planning and control. The techniques of production planning and control are not only applicable to manufacturing firms but also to service industry.

### **Scope of course:**

Production Planning and Control departments uses scientific methods, tools and techniques on complex problems arising in the direction and management of large scale integrated systems of men, machines, materials, methods and money in an industry. Towards the end of the course it is expected that the students would be skilled to become member of production planning and control department of any manufacturing organization and envision the applicability of the same for service industry. The course in general is designed to impart the following skills,

1. Understand the requirement of production planning and control for manufacturing organizations.
2. Develop skills to estimate and use appropriate planning and control techniques.
3. Ability to evaluate, analyze and make decisions for short term as well as long term organizational growth, and
4. Develop skills to perform production planning and control operations for any manufacturing organization.

### **Pre-requisites:**

1. Knowledge in basic manufacturing processes – Job shop and Flow shop



2. Machine Tool
3. Industrial Management
4. Machine Drawing
5. Production Drawing
6. Linear Regression and Correlation
7. Operations Research

**Course Contents – As per JNTUH Syllabus:**

**UNIT – I**

**Introduction:** Definition – Objectives of Production Planning and Control Functions of production planning and control - Types of production systems - Organization of production planning and control department.

**Forecasting** – Definition- uses of forecast- factors affecting the forecast- types of forecasting- their uses - general principle of forecasting. Forecasting techniques- quantitative and qualitative techniques. Measures of forecasting errors.

**UNIT – II**

**Inventory management** – Functions of inventories – relevant inventory costs – ABC analysis – VED analysis – Basic EOQ model- Inventory control systems –continuous review systems and periodic review systems, MRP I, MRP II, ERP, JIT Systems - Basic Treatment only.

**Aggregate planning** – Definition – aggregate-planning strategies aggregate planning methods – transportation model.

**UNIT – III**

**Line Balancing:** Terminology, Methods of Line Balancing, RPW method, Largest Candidate method and Heuristic method. Routing – Definition – Routing procedure – Factors affecting routing procedure, Route Sheet.

**UNIT – IV**

**Scheduling** –Definition – Scheduling Policies – types of scheduling methods – differences with loading – flow shop scheduling – job shop scheduling, line of balance (LOB) – objectives - steps involved.

**UNIT – V**

**Dispatching:** Definition – activities of dispatcher – dispatching procedures – various forms used in dispatching.

**Follow up:** definition – types of follow up – expediting – definition – expediting procedures Applications of computers in planning and control.

**Relevant syllabus for GATE:**

Forecasting models, Aggregate production planning, Scheduling, Materials Requirement Planning, Inventory control.

**Relevant syllabus for IES:**

Forecasting models - Moving average, exponential smoothing, Capacity planning, Scheduling, Materials Requirement Planning, Inventory control - ABC analysis, EOQ model; Assembly line balancing, Product development, Break-even analysis.

**. On completion of this Subject / Course the Student shall be able to:**

	Course Outcome	Bloom's Taxonomy
CO1.	Understand the role Production Planning and control	L2-Understand



	activities in Manufacturing and Services.	
CO2.	Understand and perform various Forecasting techniques and problems	L2-Understand
CO3.	Understand and perform various Inventory Management techniques and apply in real manufacturing scenario/How to use MRP/ERP	L2-Understand
CO4.	Demonstrate various Scheduling procedures/Balancing concepts	L3-Demonstrate
CO5.	Understand and Evaluate Dispatching procedures	L3-Evaluate

### 1. HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes (PO)		Level	Proficiency assessed by
PO1	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems related to Mechanical Engineering.	2	Assignment/End term examination
PO2	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems related to Mechanical Engineering and reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.	2	Assignment/End term examination
PO3	<b>Design/development of solutions:</b> Design solutions for complex engineering problems related to Mechanical Engineering and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	2	Assignment/End term examination
PO4	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.	1	Assignment/End term examination
PO5	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	1	Assignment/End term examination
PO6	<b>The engineer and society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the	None	



Program Outcomes (PO)		Level	Proficiency assessed by
	Mechanical Engineering professional engineering practice.		
PO7	<b>Environment and sustainability:</b> Understand the impact of the Mechanical Engineering professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	None	
PO8	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.	1	Assignment/End term examination
PO9	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	N	
PO10	<b>Communication:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	N	
PO11	<b>Project management and finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.	None	
PO12	<b>Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	N	

1: Slight (Low)      2: Moderate (Medium)      3: Substantial (High)      - : None

## 2. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED

Program Specific Outcomes (PSO)		Level	Proficiency assessed by
PSO1	The student will be able to apply the knowledge of Mathematics, Sciences and engineering fundamentals to formulate, analyze and provide solutions for the problems related to Mechanical engineering and communicate them effectively to the concerned.	1	Assignment/End term examination
PSO2	Design mechanical systems in various fields such as machine elements, thermal, manufacturing, industrial and inter-disciplinary fields by using various engineering/technological tools to meet the mercurial needs of the industry and society at large.	1	Assignment/End term examination
PSO3	The ability to grasp the latest development, methodologies of mechanical engineering and possess competent knowledge of design process, practical proficiencies, skills and knowledge of programme	None	



Program Specific Outcomes (PSO)		Level	Proficiency assessed by
and developing ideas towards research.			

1: Slight (Low)    2: Moderate (Medium)    3: Substantial (High)    - : None

### 3. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Objective	Program Outcomes (PO)												Program Specific Outcomes (PSO)			
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3	
CO 1	N	N	N	N	N	1	N	N	N	N	N	N	N	N	N	N
CO 2	2	2	2	N	N	N	N	N	N	N	N	N	N	N	N	N
CO 3	2	2	2	N	N	N	N	N	N	N	N	N	N	N	N	N
CO 4	2	2	N	N	N	N	N	N	N	N	N	N	N	N	N	N
CO 5	2	2	N	N	N	N	N	N	N	N	N	N	N	N	N	N

1: Slight (Low)    2: Moderate (Medium)    3: Substantial (High)    - : None

#### Lesson Plan:

The course will proceed as follows for all sections. Please note that the week and the classes in each week are relative to each section.

DEPARTMENT OF MECHANICAL ENGINEERING									
LESSON PLAN ACADEMIC YEAR 2020-2021 II SEM									
Course Instructor : Dr. Naveen Krishna									
Class: ME-IV-A/B									
Subject: Production Planning & Control									
WEF :26/03/2021									
Lecture No.	Unit No.	Date	Topics to be covered	Link for PPT	Link for PDF	Link for Small Projects/ Numerical(if any)	Course learning outcomes	Teaching Methodology	Reference
1	1	Week-1	Introduction: Definition	<a href="https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing">https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing">https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing</a>		L2-Understand	PPT, Digital Pad	Text book 1 & 2



2		Objectives & Functions of PPC	<a href="https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing">https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing">https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing</a>		L2-Understand	PPT, Digital Pad
3		Internal & Organizational level	<a href="https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing">https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing">https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing</a>		L2-Understand	PPT, Digital Pad
4		<b>Student PPT</b>					
5	Week-2	Production types and Elements	<a href="https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing">https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing">https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing</a>		L2-Understand	PPT, Digital Pad
6		Forecasting- Introduction, Principles and Importance	<a href="https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing">https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing">https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing</a>		L2-Understand	PPT, Digital Pad
7		Types of forecasting - their uses	<a href="https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing">https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing">https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing</a>		L1 & L2 Understand	PPT, Digital Pad
8		<b>Student PPT</b>					
9	Week-3	Forecasting techniques – qualitative & Quantitative Methods	<a href="https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing">https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing">https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1SryIEW0F2MW5r7JZ_vaTrLpx5bIsskEm?usp=sharing">https://drive.google.com/drive/folders/1SryIEW0F2MW5r7JZ_vaTrLpx5bIsskEm?usp=sharing</a>	L1 & L2 Understand	PPT, Digital Pad
10		Forecasting Errors and Linear Regression	<a href="https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing">https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JeZWyYcl?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing">https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-O4XzI0_cfzbAZ1Ro?usp=sharing</a>		L1 & L2 Understand	PPT, Digital Pad



11			Problems	<a href="https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JcZWYycl?usp=sharing">https://drive.google.com/drive/folders/1R3ogWGJPEsxG4clU21LJ7bQ0JcZWYycl?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-04XzI0_cfzbAZ1Ro?usp=sharing">https://drive.google.com/drive/folders/1T7QCgq0Jbv0NY87-04XzI0_cfzbAZ1Ro?usp=sharing</a>		L3 apply	PPT, Digital Pad		
12			<b>Student PPT</b>							
<b>MOCK TEST 1</b>										
13	2	Week-4	Inventory management, Functions of inventories	<a href="https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing">https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing">https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing</a>		L1 & L2 Understanding	PPT, Digital Pad	Text book 1 & 2	
14			Relevant inventory costs, EOQ model	<a href="https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing">https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing">https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1ti0TZKVNQVR1TFVbbECSBFZMDNfi3m6M?usp=sharing">https://drive.google.com/drive/folders/1ti0TZKVNQVR1TFVbbECSBFZMDNfi3m6M?usp=sharing</a>	L1 & L2 Understanding	PPT, Digital Pad		
15			ABC Analysis, VED Analysis	<a href="https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing">https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing">https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1ti0TZKVNQVR1TFVbbECSBFZMDNfi3m6M?usp=sharing">https://drive.google.com/drive/folders/1ti0TZKVNQVR1TFVbbECSBFZMDNfi3m6M?usp=sharing</a>	L1 & L2 Understanding	PPT, Digital Pad		
16			<b>Student PPT</b>							
17	2	Week-5	Inventory Control Systems: Continuous and Periodic	<a href="https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing">https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing">https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1ti0TZKVNQVR1TFVbbECSBFZMDNfi3m6M?usp=sharing">https://drive.google.com/drive/folders/1ti0TZKVNQVR1TFVbbECSBFZMDNfi3m6M?usp=sharing</a>	L3 apply	PPT, Digital Pad	Text book 1 & 2	
18			MRP 1, MRP 11, ERP and JIT	<a href="https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing">https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing">https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing</a>		L1 & L2 Understanding	PPT, Digital Pad		



					<a href="#">?usp=sharing</a>					
19			<b>Aggregate planning – Definition and Strategies</b>	<a href="https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing">https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing">https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing</a>		L3 apply	PPT, Digital Pad		
20			<b>Student PPT</b>							
21		Week-6	Aggregate Planning Methods	<a href="https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing">https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing">https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing</a>		L1 & L2 Understand	PPT, Digital Pad	Text book 1 & 2	
22	Transportation Methods		<a href="https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing">https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing">https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1ti0TZKVNQVR1TFVbbECSBFZMDNfi3m6M?usp=sharing">https://drive.google.com/drive/folders/1ti0TZKVNQVR1TFVbbECSBFZMDNfi3m6M?usp=sharing</a>	L3 & L4 Apply and Analyze	PPT, Digital Pad			
23	Problems		<a href="https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing">https://drive.google.com/drive/folders/1CxXOWafVNmGnHWHwolyQfIxhsjFdpfGd?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing">https://drive.google.com/drive/folders/18DJx04XegYgLdrscgSlc-Tfj0kAq43Ju?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1ti0TZKVNQVR1TFVbbECSBFZMDNfi3m6M?usp=sharing">https://drive.google.com/drive/folders/1ti0TZKVNQVR1TFVbbECSBFZMDNfi3m6M?usp=sharing</a>	L3 & L4 Apply and Analyze	PPT, Digital Pad			
24			<b>Student PPT</b>							
25	3	Week-7	LOB (Line of Balance): Introduction and Terminology	<a href="https://drive.google.com/drive/folders/1ROoTKllyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing">https://drive.google.com/drive/folders/1ROoTKllyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1RXxqG2pgOug_NwWnVerSbOclDulhRvhL?usp=sharing">https://drive.google.com/drive/folders/1RXxqG2pgOug_NwWnVerSbOclDulhRvhL?usp=sharing</a>		L2 Understand	PPT, Digital Pad	Text book 1 & 2	



26		Ranked Positional Weight Method (RPW)	<a href="https://drive.google.com/drive/folders/1ROoTKIlyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing">https://drive.google.com/drive/folders/1ROoTKIlyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1RXxqG2pgOug_NwWnVerSbOclDulhRvhL?usp=sharing">https://drive.google.com/drive/folders/1RXxqG2pgOug_NwWnVerSbOclDulhRvhL?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1OEVGIlc7Fw1-m5GnVxggRV9iXkwjGvQ9?usp=sharing">https://drive.google.com/drive/folders/1OEVGIlc7Fw1-m5GnVxggRV9iXkwjGvQ9?usp=sharing</a>	L1, L2, L3 and L4	PPT, Digital Pad	Text book 1 & 2
27		Largest Candidate Rule (LCR) Method	<a href="https://drive.google.com/drive/folders/1ROoTKIlyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing">https://drive.google.com/drive/folders/1ROoTKIlyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1RXxqG2pgOug_NwWnVerSbOclDulhRvhL?usp=sharing">https://drive.google.com/drive/folders/1RXxqG2pgOug_NwWnVerSbOclDulhRvhL?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1OEVGIlc7Fw1-m5GnVxggRV9iXkwjGvQ9?usp=sharing">https://drive.google.com/drive/folders/1OEVGIlc7Fw1-m5GnVxggRV9iXkwjGvQ9?usp=sharing</a>	L1, L2, L3 and L4	PPT, Digital Pad	Text book 1 & 2
28		<b>Student PPT</b>						
<b>MID 1</b>								
29	Week-8	Heuristic Method	<a href="https://drive.google.com/drive/folders/1ROoTKIlyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing">https://drive.google.com/drive/folders/1ROoTKIlyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1RXxqG2pgOug_NwWnVerSbOclDulhRvhL?usp=sharing">https://drive.google.com/drive/folders/1RXxqG2pgOug_NwWnVerSbOclDulhRvhL?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1OEVGIlc7Fw1-m5GnVxggRV9iXkwjGvQ9?usp=sharing">https://drive.google.com/drive/folders/1OEVGIlc7Fw1-m5GnVxggRV9iXkwjGvQ9?usp=sharing</a>	L2 Understanding	PPT, Digital Pad	Text Book- 1 & 2
30		Routing: Definition, Routing procedure	<a href="https://drive.google.com/drive/folders/1ROoTKIlyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing">https://drive.google.com/drive/folders/1ROoTKIlyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1RXxqG2pgOug_NwWnVerSbOclDulhRvhL?usp=sharing">https://drive.google.com/drive/folders/1RXxqG2pgOug_NwWnVerSbOclDulhRvhL?usp=sharing</a>		L2 Understanding	PPT, Digital Pad	Text Book- 1 & 2
31		Factors affecting routing procedure and Route Sheets	<a href="https://drive.google.com/drive/folders/1ROoTKIlyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing">https://drive.google.com/drive/folders/1ROoTKIlyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1RXxqG2pgOug_NwWnVerSbOclDulhRvhL?usp=sharing">https://drive.google.com/drive/folders/1RXxqG2pgOug_NwWnVerSbOclDulhRvhL?usp=sharing</a>		L2 Understanding	PPT, Digital Pad	Text Book- 1 & 2
32		<b>Student PPT</b>						



33	4	Week-9	Scheduling – definition, Difference between loading and scheduling	<a href="https://drive.google.com/drive/folders/1ROoTKllyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing">https://drive.google.com/drive/folders/1ROoTKllyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1GksJjhfo-ovV_tJOvoW1RbrrUPps7P1Q?usp=sharing">https://drive.google.com/drive/folders/1GksJjhfo-ovV_tJOvoW1RbrrUPps7P1Q?usp=sharing</a>		L1 & L2 Understanding	PPT, Digital Pad	Text Book- 1& 2
34			Scheduling Policies	<a href="https://drive.google.com/drive/folders/1ROoTKllyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing">https://drive.google.com/drive/folders/1ROoTKllyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1GksJjhfo-ovV_tJOvoW1RbrrUPps7P1Q?usp=sharing">https://drive.google.com/drive/folders/1GksJjhfo-ovV_tJOvoW1RbrrUPps7P1Q?usp=sharing</a>		L1 & L2 Understanding	PPT, Digital Pad	Text Book- 1& 2
35			Standard scheduling methods & techniques for flow shop	<a href="https://drive.google.com/drive/folders/1ROoTKllyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing">https://drive.google.com/drive/folders/1ROoTKllyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1GksJjhfo-ovV_tJOvoW1RbrrUPps7P1Q?usp=sharing">https://drive.google.com/drive/folders/1GksJjhfo-ovV_tJOvoW1RbrrUPps7P1Q?usp=sharing</a>		L3 & L4 Apply and Analyze	PPT, Digital Pad	Text Book- 1& 2
36			<b>Student PPT</b>						
37	4	Week-10	Flow Shop Scheduling	<a href="https://drive.google.com/drive/folders/1ROoTKllyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing">https://drive.google.com/drive/folders/1ROoTKllyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1GksJjhfo-ovV_tJOvoW1RbrrUPps7P1Q?usp=sharing">https://drive.google.com/drive/folders/1GksJjhfo-ovV_tJOvoW1RbrrUPps7P1Q?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1AdDXdS1ZF5yvKO-OH1suMgVTYbFSJuOd?usp=sharing">https://drive.google.com/drive/folders/1AdDXdS1ZF5yvKO-OH1suMgVTYbFSJuOd?usp=sharing</a>	L3 & L4 Apply and Analyze	PPT, Digital Pad	Text Book- 1& 2
38			Job Shop Scheduling	<a href="https://drive.google.com/drive/folders/1ROoTKllyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing">https://drive.google.com/drive/folders/1ROoTKllyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1GksJjhfo-ovV_tJOvoW1RbrrUPps7P1Q?usp=sharing">https://drive.google.com/drive/folders/1GksJjhfo-ovV_tJOvoW1RbrrUPps7P1Q?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1AdDXdS1ZF5yvKO-OH1suMgVTYbFSJuOd?usp=sharing">https://drive.google.com/drive/folders/1AdDXdS1ZF5yvKO-OH1suMgVTYbFSJuOd?usp=sharing</a>	L3 & L4 Apply and Analyze	PPT, Digital Pad	Text Book- 1& 2
39			Problems	<a href="https://drive.google.com/drive/folders/1ROoTKllyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing">https://drive.google.com/drive/folders/1ROoTKllyGNMW0RVT94n2pOLCpSuGTf14?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1GksJjhfo-ovV_tJOvoW1RbrrUPps7P1Q?usp=sharing">https://drive.google.com/drive/folders/1GksJjhfo-ovV_tJOvoW1RbrrUPps7P1Q?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1AdDXdS1ZF5yvKO-OH1suMgVTYbFSJuOd?usp=sharing">https://drive.google.com/drive/folders/1AdDXdS1ZF5yvKO-OH1suMgVTYbFSJuOd?usp=sharing</a>			



40			<b>Student PPT</b>						
			<b>MOCK 2</b>						
41	5	Week-11	Dispatching : Difinition and Procedure	<a href="https://drive.google.com/drive/folders/111U6IjOTgI0I5Z9WxDcVSZMcgNoJA55B?usp=sharing">https://drive.google.com/drive/folders/111U6IjOTgI0I5Z9WxDcVSZMcgNoJA55B?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1UcKJsbtvm0udzue0CALTQ-mVQKZaWAVT?usp=sharing">https://drive.google.com/drive/folders/1UcKJsbtvm0udzue0CALTQ-mVQKZaWAVT?usp=sharing</a>		L2 Understand	PPT, Digital Pad	Text Book- 1& 2
42			Various Forms used in Dispatching	<a href="https://drive.google.com/drive/folders/111U6IjOTgI0I5Z9WxDcVSZMcgNoJA55B?usp=sharing">https://drive.google.com/drive/folders/111U6IjOTgI0I5Z9WxDcVSZMcgNoJA55B?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1UcKJsbtvm0udzue0CALTQ-mVQKZaWAVT?usp=sharing">https://drive.google.com/drive/folders/1UcKJsbtvm0udzue0CALTQ-mVQKZaWAVT?usp=sharing</a>		L2 Understand	PPT, Digital Pad	Text Book- 1& 2
43			<b>Student PPT</b>						
44	5	Week-12	<b>Follow Up: Difinition and Types of Follow Up</b>	<a href="https://drive.google.com/drive/folders/111U6IjOTgI0I5Z9WxDcVSZMcgNoJA55B?usp=sharing">https://drive.google.com/drive/folders/111U6IjOTgI0I5Z9WxDcVSZMcgNoJA55B?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1UcKJsbtvm0udzue0CALTQ-mVQKZaWAVT?usp=sharing">https://drive.google.com/drive/folders/1UcKJsbtvm0udzue0CALTQ-mVQKZaWAVT?usp=sharing</a>		L2 Understand	PPT, Digital Pad	Text Book- 1& 2
45			Expediting definition and procedure	<a href="https://drive.google.com/drive/folders/111U6IjOTgI0I5Z9WxDcVSZMcgNoJA55B?usp=sharing">https://drive.google.com/drive/folders/111U6IjOTgI0I5Z9WxDcVSZMcgNoJA55B?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1UcKJsbtvm0udzue0CALTQ-mVQKZaWAVT?usp=sharing">https://drive.google.com/drive/folders/1UcKJsbtvm0udzue0CALTQ-mVQKZaWAVT?usp=sharing</a>		L2 Understand	PPT, Digital Pad	Text Book- 1& 2
46			<i>Applications of computers in planning and control</i>	<a href="https://drive.google.com/drive/folders/111U6IjOTgI0I5Z9WxDcVSZMcgNoJA55B?usp=sharing">https://drive.google.com/drive/folders/111U6IjOTgI0I5Z9WxDcVSZMcgNoJA55B?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1UcKJsbtvm0udzue0CALTQ-mVQKZaWAVT?usp=sharing">https://drive.google.com/drive/folders/1UcKJsbtvm0udzue0CALTQ-mVQKZaWAVT?usp=sharing</a>		L2 Understand	PPT, Digital Pad	Text Book- 1& 2
47			Supply Chain Management Technoiques	<a href="https://drive.google.com/drive/folders/111U6IjOTgI0I5Z9WxDcVSZMcgNoJA55B?usp=sharing">https://drive.google.com/drive/folders/111U6IjOTgI0I5Z9WxDcVSZMcgNoJA55B?usp=sharing</a>	<a href="https://drive.google.com/drive/folders/1UcKJsbtvm0udzue0CALTQ-mVQKZaWAVT?usp=sharing">https://drive.google.com/drive/folders/1UcKJsbtvm0udzue0CALTQ-mVQKZaWAVT?usp=sharing</a>	<a href="https://classroom.google.com/c/NTkwODEyNzg0Mzda/m/MzA3NDQ5MjEyMDYy/details">https://classroom.google.com/c/NTkwODEyNzg0Mzda/m/MzA3NDQ5MjEyMDYy/details</a>		L2 Understand	PPT, Digital Pad
<b>II Mid Examinations</b>									



### **Suggested Books:**

#### **a. Textbooks:**

1. K C Jain and L N Agarwal, Production Planning and Control, 6<sup>th</sup> edition, Khanna Publishers, 2008.
2. M Mahajan, Production Planning and Control, Dhanpat Rai & Co., 2010.

#### **b. Reference Books:**

3. R Paneerselvam, Production & Operations Management, 2<sup>nd</sup> edition, PHI Publications, 2006.
4. E S Baffa and R K Sarin, Modern Production & Operation Managements, 8<sup>th</sup> edition, Wiley Publications, 2009.
5. O P Khanna, Industrial Engineering and Management, Dhanpat Rai & Co., 2009.
6. Samuel Eilon, Elements of Production Planning and Control, The Macmillan Company, New York, 1962.
7. S D Sharma, Operations Research, Kedarnath Ramnath Publishers, 1996.
8. J K Sharma, Operations Research, 4<sup>th</sup> edition, Macmillan India Limited, 2009.
9. P Ramamurthy, Production and Operations Management, New Age International Publications, 2007
10. K L Narayana, P Kannaiah and K Venkata Reddy, Machine Drawing, 3<sup>rd</sup> edition, New Age Publications, 2006.

### **Question Bank:**

#### **a. Descriptive questions:**

#### **UNIT I**

#### **SHORT QUESTIONS**

Questions	CO Mapping
1. Define the term production planning and control?	C01
2. Define the terms planning and controlling?	C01
3. Explain mass production?	C01
4. Describe continuous production?	C01
5. Explain the relationship between production planning and control?	C01
6. Define production planning and control.	C01
7. List the objectives of PPC.	C01
8. What are the phases of production planning and control?	C01
9. List various functions of PPC.	C01
10. What is production system?	C01
11. List the types of production system	C01
12. What are the objectives of product analysis?	C01
13. List the various factors that influence the product design.	C01
	C01

#### **LONG QUESTIONS**

Questions	CO Mapping
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Differentiate between job order production and batch production systems?	C01
2. Describe the functions of production planning and control?	C01
3. Explain planning in manufacturing organization?	C01
4. What are the objectives of production planning?	C01
5. State the purpose of manufacturing organization in an industry?	C01
6. Briefly explain the prerequisites of PPC.	C01
7. Explain the production lifecycle with the aid of a graph.	C01
8. "PPC regulates and controls "how," "where," and "when" work is to be done." What do you understand by this statement?	C01
9. State the principles of good production planning and control.	C01
10. What are the levels of aggregation in forecasting for a manufacturing organization? How should this hierarchy of forecasts be linked and used?	C01
11. List out the advantages and disadvantages of short term long term forecasting.	C01
12. A firm uses simple exponential smoothing with $\alpha = 0.1$ to forecast demand. The forecast for the week of February 1 was 500 units, whereas actual demand turned out to be 450 units.	C01
13. Forecast the demand for the week of February	C01
14. Assume that the actual demand during the week of February 8 turned out to be 505 units. Forecast the demand for the week of February 15, Continue forecasting through March 15, assuming that subsequent demands were actually 516, 488, 467, 554 and 510	C01
15. Explain the scope of production planning and control	

## UNIT II

### Short Questions

Questions	CO Mapping
1. Define forecasting?	C02
2. Explain types of forecasting?	C02
3. List quantitative methods of forecasting?	C02
4. Describe various steps involved in forecasting?	C02
5. Explain regression method?	C02
6. Differentiate between the production planning and production control.	C02
7. How the "controlling" can be done to regulate the progress of work?	C02
8. Give the step by step Forecasting procedure for using time series	C02
9. List out the various functions of production planning and control	C02
10. What are the needs for PPC?	C02
11. What is the importance of forecasting?	C02
12. What are the differences between short term and long term forecasting?	C02
13. What are the functions of PPC	C02
14. What kind of pre-requisite data is a must to actually begin with the activities of PPC?	C02



### Long Questions

Questions	CO Mapping
1.State the objectives of long term and short term forecasting?	C02
2. What are the advantages of forecasting?	C02
3. Describe moving average method?	C02
4. Explain types of forecasting?	C02
5. Explain Delphi method?	C02
6. Explain different types of production systems and differentiate between them.	C02
7. Distinguish between production planning and production control and state their objectives.	C02
8. Discuss organization of Production planning and control department.	C02
9. Discuss the factors which affects the choice of forecasting method..	C02
10. Forecast the production for next two years when the production quantity for last ten years is as follows: 200, 225, 235, 240, 255, 260, 265, 275, 270, 271	C02
11. Use the following methods and comment on results	C02
12. Moving average (3 years and 5 years)	C02
13. Exponential smoothing for $\alpha=0.3$ and 0.7.	C02

### UNIT III

#### Short Questions

Questions	CO Mapping
1.Define inventory?	C03
2. What are the functions of inventory?	C03
3. Explain shortage or penalty cost?	C03
4. What is economic order quantity?	C03
5. Define economic lot size?	C03
6. Write the various types of inventory.	C03
7. What is safety stock?	C03
8. What is lead time?	C03
9. What is reorder point?	C03
10. What is order quantity?	C03
11. What is economic order quantity?	C03
12. What are the characteristics of two bin system?	C03
13. What is purchase cost?	C03
14. What is ordering cost?	C03

#### Long Questions

Questions	CO Mapping
1.What are the types of inventory?	C03
2. Explain direct inventories?	C03



3. Describe the cost associated with inventories?	C03
4. Explain carrying cost and ordering cost?	C03
5. Derive the formula for determining EOQ?	C03
6. Describe the various inputs to MRP system?	C03
7. Differentiate between MRP/MRP-II and ERP?	C03
8. What are the Japanese concepts used in JIT (Just in time)?	C03
9. Explain the VED analysis	C03
10. Write short notes on P-System	C03
11. Write short notes on Q-System	C03
12. Explain the procedure involved in carrying ABC analysis	C03

## UNIT IV

### Short Questions

Questions	CO Mapping
1. Define scheduling.	C04
2. Define production control.	C04
3. Define master schedule.	C04
4. What is expediting?	C04
5. What is Gantt chart?	C04
6. Define line balancing.	C04
7. What do you mean by MRP?	C04
8. Define routing.	C04
9. Define bill of materials.	C04
10. What is aggregate planning?	C04
11. Explain line of balance?	C04
12. What is Enterprise Resource planning	C04
13. Explain about JIT Production System?	C04

### Long Questions

Questions	CO Mapping
	C04
1. Explain Routing procedure?	C04
2. What is the information required on the Bill of material form?	C04
3. Explain expediting and follow up?	C04
4. Name types of scheduling? Explain?	C04
5. What are the objectives of aggregate production planning?	C04
6. What are the factors affecting routing procedure	C04
7. State the important factors that affecting routing procedure	C04
8. Distinguish between loading and scheduling	C04
9. a. What is route sheet?	C04
b. What is the information it contains	C04
10. a. Write short notes on Job shop.	C04
b. Write shore notes on Flow Shop	C04
	C04



## UNIT V

### Short Questions

Questions	CO Mapping
1. What is dispatching?	C05
2. What are the activities of dispatcher?	C05
3. Explain dispatching rule.	C05
4. What is move order?	C05
5. What is tool order?	C05
6. What is job ticket?	C05
7. What is inspection order?	C05
8. What is store order?	C05
9. What is finished product order?	C05
10. What is machine load chart?	C05
11. What is dispatching?	C05

### Long Questions

Questions	CO Mapping
1. Explain the functions of dispatching?	C05
2. Explain dispatching procedure?	C05
3. Explain centralised dispatching?	C05
4. Explain the advantages of decentralised dispatching?	C05
5. Describe briefly the application of computer in PPC?	C05
6. Write short notes on Dispatching procedure.	C05
7. Write short notes on Activities of dispatches	C05
8. List out various forms raised by dispatcher?	C05
9. Explain the applications of computer in Production Planning & Control	C05
10. Write short notes on Applications of computer in PPC.	C05
11. a. What is follow up	C05
b. Explain follow up significance in production	C05

#### b. Objective questions

##### Unit-I (Relevant to JNTU)

- 1) In jobbing production, (a) High skilled worker (b) Unit cost is high (c) Both (d) None
- 2) Job evaluation is method of determining the (a) Relative values of Job (b) Workers performance on job (c) Both (d) None
- 3) In general, automobiles (heavy vehicles) body building is (a) Batch production (b) Job order production (c) Mass production (d) none
- 4) Vehicle manufacturing assembly line is an example of (a) product layout (b) process layout (c) manual layout (d) fixed layout
- 5) Military organization can be categorized as (a) Line organization (b) Functional organization (c) Both (d) None.
- 6) BEA stands for \_\_\_\_\_.
- 7) A plant layout is an arrangement of \_\_\_\_\_ in the plant.



- 8) Future course of action is called \_\_\_\_\_.
- 9) P.P.C stands for \_\_\_\_\_.
- 10) The ratio of output to input is called \_\_\_\_\_.

### Unit-II (Relevant to JNTU, GATE & IES)

- 1) Forecasts are usually classified by time horizon into three categories \_\_\_\_\_ (a) short-range, medium-range, and long-range (b) finance/accounting, marketing, and operations (c) strategic, tactical, and operational, (d) exponential smoothing, regression, and time series
- 2) The two general approaches to forecasting are (a) mathematical and statistical (b) judgmental and qualitative (c) historical and associative (d) qualitative and quantitative
- 3) Which of the following is not a step in the forecasting process? (a) determine the use of the forecast (b) eliminate any assumptions, (c) determine the time horizon (d) select a forecasting model(s)
- 4) Which of the following forecasting methods takes a fraction of forecast error into account for the next period forecast? (a) Simple average method (b) moving average method (c) weighted moving average method (d) exponential smoothing method
- 5) The demand and forecast for February are 12000 and 10275 respectively. Using single exponential smoothing method (smoothing coefficient = 0.25), forecast for the month of March is (a) 431 (b) 9587 (c) 10706 (d) 11000
- 6) The data for 5 consecutive periods is 1, 2, 3, 4 and 5. Then as per 5 period moving average, the forecast for 6<sup>th</sup> period is (a) 1 (b) 2 (c) 3 (d) 4
- 7) In simple exponential smoothing forecast, to give higher weightage to recent demand information, the smoothing constant must be close to (a) -1 (b) zero (c) 0.5 (d) 1
- 8) In a time series forecasting model, the demand for 5 time periods was 10, 13, 15, 18 and 22. A linear regression fit resulted in an equation  $F=6.9+2.9*t$  where F is the forecast for period t. The sum of absolute deviations for the five data is: (a) 2.2 (b) 0.2 (c) -1.2 (d) 24.3
- 9) When using a simple moving average to forecast demand, one would (a) give equal weight to all demand data (b) assign more weight to the recent demand data (c) include new demand data in the average without discarding the earlier data (d) include new demand data in the average after discarding some of the earlier demand data
- 10) The predicted demand during certain period is 150 units and actually found to be 125 units. If  $\alpha = 0.4$ , the forecast for next period is \_\_\_\_\_
- 11) \_\_\_\_\_ is the estimation of the value of a variable (or set of variables) at some future point in time.
- 12) A number of factors have to be taken into account in what is called a \_\_\_\_\_ analysis.
- 13) Planning policy is based on \_\_\_\_\_.
- 14) Delphi method is suitable for \_\_\_\_\_ range of forecast.
- 15) The forecasting approach suitable for new product is \_\_\_\_\_.

### Unit-III (Relevant to JNTU, GATE & IES)

- 1) Usable but presently idle resource is generally called as (a) Reserves (b) Material in Hand (c) Inventory (d) none



- 2) Materials and components being worked on or waiting between operations in the organization is called as (a) Raw material (b) Components (c) Finished products (d) Work in progress
- 3) \_\_\_\_\_ Analysis is based on the level of difficulty in the procurement of inventory (a) ABC (b) VED (c) SDE (d) XYZ
- 4) In VED analysis 'V' stands for \_\_\_\_\_ items (a) Vital (b) Very good (c) very poor (d) none
- 5) If we increase or decrease the EOQ by twice, the increase in total cost is (a) 100% (b) 75% (c) 50% (d) 25%
- 6) \_\_\_\_\_ is also called as optimal order quantity (a) JIT, (b) EOQ, (c) ABC, (d) none
- 7) A.B.C analysis stands for (a) Always better control (b) Alternate better control (c) either (d) None
- 8) A-B-C analysis is used in (a) CPU (b) PERT (c) Inventory control (d) All of those.
- 9) \_\_\_\_\_ includes variety of techniques for managing the inventory of a firm.
- 10) Always better control (ABC) analysis is a \_\_\_\_\_ tool for selective control.
- 11) Define buffer stock \_\_\_\_\_.
- 12) Example for finished goods inventory is \_\_\_\_\_.
- 13) Holding cost is also called \_\_\_\_\_.
- 14) One of the important tools in inventory control is the \_\_\_\_\_ order quantity formula.
- 15) Raw material which is kept in stock for use in the production of goods is called \_\_\_\_\_.

### **Unit-III (Relevant to JNTU, GATE & IES)**

- 1) \_\_\_\_\_ approach is to have less in-process inventory on hand (a) EPR, (b) ABC, (c) JIT, (d) none
- 2) \_\_\_\_\_ is a computerized information system that integrates and coordinates the operations of a firm (a) ABC analysis, (b) EOQ, (c) ERP, (d) none
- 3) \_\_\_\_\_ is an inventory model that can handle dependent demand (a) material requirements planning (b) just in time (c) EOQ (d) none
- 4) J.I.T stands for (a) Just in time (b) Juran In Time (c) Both (d) None
- 5) In an MRP system, component demand is: (a) forecasted (b) established by the master production schedule (c) calculated by the MRP system from the master production schedule (d) ignored
- 6) The word 'kanban' is most appropriately associated with (a) economic order quantity (b) just-in-time production (c) capacity planning (d) product design
- 7) In KAIZEN muda means (a) Waste (b) Strain (c) Discrepancy (d) None
- 8) In KAIZEN mura means (a) Waste (b) Unevenness (c) Standard (d) None
- 9) In KAIZEN muri means (a) Unreasonable (b) Overburden (c) Immoderation (d) All the above
- 10) \_\_\_\_\_ is a computational technique that converts the master schedule for end products into a detailed schedule for the raw materials and components used in the end products.



- 11) Just-In-Time (JIT) is one of the fundamental approaches used in the \_\_\_\_\_ production system.
- 12) Material requirement planning (MRP) is often thought of as a method of \_\_\_\_\_ control.
- 13) MRP stands for \_\_\_\_\_.
- 14) One technique of implementing JIT is a manual procedure called \_\_\_\_\_.
- 15) KAIZEN is a Japanese word KAI and ZEN means \_\_\_\_\_ and \_\_\_\_\_.

#### **Unit-IV (Relevant to JNTU)**

- 1) \_\_\_\_\_ loading is carried out in conjunction with routing to ensure smooth work flow (a) machine (b) production (c) axial (d) longitudinal
- 2) \_\_\_\_\_ does play role in production orders with specifications of feeds, speeds (a) estimation (b) planning (c) sequence (d) control
- 3) \_\_\_\_\_ step/s is/are involved in routing (a) Type of work to be done on product or its parts (b) Operations required to do the work (c) Sequence of operations required (d) All the above
- 4) Operation sheet can compute \_\_\_\_\_ production quantities (a) worst (b) economic (c) simple (d) complicate
- 5) Routing is affected by \_\_\_\_\_ factors (a) Nature of manufacturing (b) Type of machines (c) Availability of machines and other resources (d) All the above
- 6) An assembly activity is represented on an Operation Process Chart by the symbol (a) (b) A (c) D (d) O
- 7) The production orders and detailed operation sheets are available with specifications of (a) feeds (b) speeds (c) attachments (d) all of these
- 8) \_\_\_\_\_ indicates the material used during manufacturing and their progress from one operation to another
- 9) \_\_\_\_\_ may be defined as the selection of path which each part of the product will follow while being transformed from raw materials to finished products
- 10) Routing is a fundamental \_\_\_\_\_ function on which all subsequent planning is based.
- 11) The bill of material (BOM) provides the \_\_\_\_\_ and content of each parent item or final product.
- 12) The operation sheet is filled in the records of the \_\_\_\_\_ department and can be used again when the order is repeated.
- 13) In the production planning \_\_\_\_\_ estimation can be made by operation sheets.
- 14) A common mathematical approach to loading for infinite capacity loading is Assignment problem whose solution can be obtained by \_\_\_\_\_.
- 15) For finite capacity loading where the capacities of the work-centers are given, heuristics like \_\_\_\_\_ can be used.

#### **Unit-IV (Relevant to JNTU, GATE & IES)**

- 1) \_\_\_\_\_ process is defined as establishing of times at which to begin and complete each event or operation comprising a procedure (a) Routing (b) Scheduling (c) Manufacturing (d) None



- 2) \_\_\_\_\_ scheduling determines the start and finish times for waiting jobs by assigning them to the latest available time slot that will enable each job to be completed just when it is due, but done before (a) backward (b) forward (c) a & b (d) none
- 3) \_\_\_\_\_ scheduling determines the start and finish times for waiting jobs by assigning them to the latest available time slot irrespective of due dates (a) Backward (b) Forward (c) Both a & b (d) None
- 4) The objective of sequencing problem is (a) To find the order in which jobs are to be made (b) To find the time required for completing all the jobs on hand (c) To find the sequence in which jobs on hand are to be processed to minimize the total time required for processing the jobs (d) To maximize the effectiveness
- 5) In solving 2 machine and 'n' jobs problem, the following assumption is wrong: (a) No passing is allowed (b) Processing times are known, (c) Handling time is negligible, (d) The time of processing depends on the order of machining
- 6) The processing time in days for six jobs arrived in a sequence is 4, 9, 5, 10, 6 and 8. Average flow time (in days) for the above jobs using Shortest Processing Time rule is (a) 20.83 (b) 23.16 (c) 125.00 (d) 139.00
- 7) The processing time in days on a machine for four jobs 1, 2, 3 and 4 are 4, 7, 2 and 8 days respectively. The due date is 6, 9, 19 and 17 respectively for the four jobs. Using the shortest processing time (SPT) rule, total tardiness is \_\_\_\_\_ and if the earliest due date (EDD) rule is used to sequence the jobs, the number of jobs delayed is \_\_\_\_\_.
- 8) \_\_\_\_\_ is/ are the principle/s of scheduling (a) principle of optimum task size (b) principle of optimum production plan (c) principle of optimum sequence (d) a, b, & c
- 9) Loading and scheduling improves \_\_\_\_\_ in the production planning (a) efficiency (b) i/p (c) o/p (d) performance
- 10) \_\_\_\_\_ scheduling is commonly used in job shops where customers place their orders on "needed as soon as possible" basis
- 11) An interval of two for which a detailed production program is prepared is called as \_\_\_\_\_.
- 12) Types of scheduling of scheduling can be categorized as \_\_\_\_\_
- 13) \_\_\_\_\_ is a visual aids used for a variety of purposes related to loading and scheduling.
- 14) \_\_\_\_\_ is intended to organize and show the actual use or the intended use of resources on a time-scaled chart.

#### **Unit-IV (Relevant to JNTU, GATE & IES)**

- 1) Dependence on an external source of supply is found in which of the following aggregate planning strategies? (a) Varying production rates through overtime or idle time, (b) subcontracting (c) using part-time workers (d) backordering during high demand periods
- 2) The planning tasks associated with staffing, production, inventory, and sub-contracting levels typically fall under \_\_\_\_\_ (a) short-range plans (b) intermediate-range plans (c) long-range plans (d) demand options
- 3) When producing batches of large units are spread over a period of several months it is called as \_\_\_\_\_ planning. (a) Short-term (b) middle-term (c) immediate-term (d) long-term



- 4) Which of these aggregate planning strategies adjusts capacity to match demand? (a) Backordering (b) using part-time workers (c) counter-seasonal product mixing (d) changing price
- 5) For an assembly line, total task time at the workstation I, II, III, IV, V and VI in minutes are 7, 9, 7, 10, 9 and 6 minutes respectively. What is the line efficiency of the assembly line? (a) 70% (b) 75% (c) 80% (d) 85%
- 6) An electronic equipment manufacturer has decided to add a component subassembly operation that can produce 80 units during a regular 8-hrs shift. The operation consist of three activities namely M-Mechanical assembly, E- Electric wiring and T-Test taking Standard time in minutes 12, 16 and 3 respectively. For line balancing, the number of work stations required for the activities M, E and T would respectively be (a) 2, 3, 1 (b) 3, 2, 1 (c) 2, 4, 2 (d) 2, 1, 3
- 7) Capacities of production of an item over 3 consecutive months in regular time are 100, 100 and 80 and in overtime are 20, 20 and 40. The demands over those 3 months are 90, 130 and 110. The cost of production in regular time and overtime are respectively Rs. 20 per item and Rs. 24 per item. Inventory carrying cost is Rs. 2 per item per month. The levels of starting and final inventory are nil. Backorder is not permitted. For minimum cost of plan, the level of planned production in overtime in the third month is (a) 40 (b) 30 (c) 20 (d) 0
- 8) Which one of the following is NOT a decision taken during the aggregate production planning stage? (a) Scheduling of machines (b) Amount of labor to be committed (c) Rate at which production should happen (d) Inventory to be carried forward
- 9) Aggregate planning is a \_\_\_\_\_ corporate planning activity.
- 10) An option for altering the availability of capacity is \_\_\_\_\_
- 11) If the cycle time is 'T' minutes, the theoretical output is \_\_\_\_\_.
- 12) In line balancing problem for the given network, if 25 assemblies are required per day, having an eight hour per day effective work time then the cycle time is \_\_\_\_\_ minutes.
- 13) The typical time horizon for aggregate planning is \_\_\_\_\_
- 14) Machine output is \_\_\_\_\_ to the cycle time.
- 15) \_\_\_\_\_ is concerned with determining the labor and equipment resources needed to achieve the master schedule.

#### **Unit-V (Relevant to JNTU)**

- 1) \_\_\_\_\_ is the process of setting production activities in motion through release of orders and instructions. (a) Routing (b) dispatching (c) manufacturing (d) scheduling
- 2) \_\_\_\_\_ activity/s are involved in dispatching (a) To assign definite work to definite machines, work centers and men (b) To issue required materials from stores (c) Release necessary work orders, time tickets, etc., to authorize timely start of operations (d) All the above
- 3) The expediting or follow up function in production control is an example of (a) LIFO (b) FIFO (c) SIRO (d) Pre-emption.
- 4) \_\_\_\_\_ authorizes the start of production activities by releasing materials, components, tools, fixtures and instruction sheets to the operator.



- 5) \_\_\_\_\_ with an on-board control panel represents the lowest level of sophistication among the possible methods.
- 6) \_\_\_\_\_ is a logical step after dispatching.
- 7) Dispatching is the \_\_\_\_\_ of setting productive activities in motion through release of orders.
- 8) Expediting as it is sometimes called is a \_\_\_\_\_ after dispatching.
- 9) The word GO means \_\_\_\_\_ the flow of information and instructions.
- 10) This communication system can mark the success or failure of the schedule \_\_\_\_\_.
- 11) Dispatching function is concerned with the execution of the \_\_\_\_\_ function.
- 12) It is the duty of the \_\_\_\_\_ function to issue requisition for material and tools on a production order.

### **Websites Addresses:**

- 1) [www.informs.org](http://www.informs.org)
- 2) <http://nptel.iitm.ac.in/video.php?subjectId=112102106>
- 3) <http://nptel.iitm.ac.in/video.php?subjectId=112107143>
- 4) <http://www.youtube.com/watch?v=zlZaOnBbpUg>
- 5) <http://www.youtube.com/watch?v=b143Y7dTfIA>
- 6) [http://www.poms.org/chapters/india\\_chapter/](http://www.poms.org/chapters/india_chapter/)
- 7) [www.isye.gatech.edu/](http://www.isye.gatech.edu/)
- 8) [www.cors.ca/](http://www.cors.ca/)
- 9) [www.orie.cornell.edu/](http://www.orie.cornell.edu/)

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- 1) Prof. Damodar Acarya, IIT-Kharagpur
- 2) Prof. S Sahu, IIT-Kharagpur
- 3) Prof. Kripa Shankar, IIT-Kanpur
- 4) Dr. Ashok K Mittal, Professor, IIT-Kanpur
- 5) Prof. Sridhar Seshadiri, ISB, Hyderabad
- 6) Prof. Prem Vrat, formerly director IIT-Delhi, IIT-Roorkee
- 7) Dr. S G Deshmukh, Professor, IIT-Delhi
- 8) Dr. Ravi Shankar, Professor, IIT-Delhi
- 9) Dr. Pradeep Kumar, Professor, IIT-Roorkee
- 10) Dr. Pramod Kumar Jain, Professor, IIT-Roorkee
- 11) Dr. Jishnu Hajra, Professor, IIM-Bangalore
- 12) Dr. S Mahajan, Professor, IIM-Bangalore
- 13) Dr. Narayan Rangaraj, Professor, IIT-Bombay
- 14) Dr. Prakash G Awate, Professor, IIT-Bombay
- 15) Prof. Stephen C Graves, MIT, Cambridge, MA
- 16) Prof. Thomas L Magnanti, MIT School of Engineering, Cambridge, MA
- 17) Prof. Eric T Bradlow, The Wharton School, Philadelphia, PA
- 18) Prof. David Simchi-Levi, MIT School of Engineering, Cambridge, MA
- 19) Prof. Hani S Mahmassani, Northwestern University, Evanston, IL
- 20) Prof. Sunil Chopra, Northwestern University, Evanston, IL

### **Journals (National & International):**



- 1) Computers and Industrial engineering
- 2) Decision sciences
- 3) Engineering Management
- 4) European Journal of Industrial Engineering
- 5) IIE transactions
- 6) Journal of Operations Management
- 7) Production and Operations Management
- 8) International Journal of Operations & Production Management
- 9) International Journal of Production Economics
- 10) International Journal of Production research
- 11) International Journal of Forecasting
- 12) International Journal of Productivity and Quality Management
- 13) International Journal of Production Planning & Control
- 14) Journal of Advances in Management Research
- 15) Management Science (USA)
- 16) Manufacturing & Service Operations Management
- 17) Production Planning & Control
- 18) Interfaces
- 19) Vikalpa

**List of Topics for Student Seminars:**

- 1) Manufacturing Systems
- 2) Production Planning & Control
- 3) Production Planning
- 4) Production Control
- 5) Forecasting
- 6) Aggregate Planning
- 7) Just-In-Time
- 8) Inventory Control
- 9) Materials Resource Planning
- 10) Enterprise Resource Planning
- 11) Routing
- 12) Scheduling
- 13) Assembly Line Balancing
- 14) Line of Balance
- 15) Dispatching
- 16) Follow up & Expediting

**Case Studies / Small Projects:**

- 1) Loading Problem
- 2) Vehicle Routing Problem
- 3) Capital Budgeting Problem
- 4) Facility Location Problem
- 5) Forecasting
- 6) Inventory Control Problems
- 7) Multi-echelon inventory system
- 8) Materials Resource Planning
- 9) Enterprise Resource Planning



- 10) Lean Manufacturing
- 11) Job Routing
- 12) Flow Shop Sequencing
- 13) Job Shop Sequencing
- 14) Planning & Scheduling Applications
- 15) Assembly Line Balancing
- 16) Three-dimensional cutting/packing of container loading
- 17) Production Planning Problem
- 18) Capacity Planning Problem
- 19) Aggregate Production Planning Problem
- 20) Assortment Planning Problem