



**P.E.S. College of Engineering, Mandya - 571 401**  
 (An Autonomous Institution affiliated to VTU, Belagavi)  
**Seventh Semester, B.E. - Industrial and Production Engineering**  
**Semester End Examination; February - 2022**  
**Operations Management**

Time: 3 hrs

Max. Marks: 100

**Course Outcomes**

The Students will be able to:

CO1: Define importance of management in the organization and the different types of in an organization. To identify and evaluate comparative approaches to operations management in a global context.

CO2: Distinguish between the Manufacturing and Service oriented organizations and solve the problems on decision making.

CO3: Define the different types of Forecasting Techniques and solve the different problems on Forecasting Technique.

CO4: Understand the concept of Break-even point and solve the different types of problems.

CO5: Understand the concept of Scheduling and solve the different types of problems on Scheduling.

**Note:** I) PART - A is compulsory. Two marks for each question.

II) PART - B: Answer any **Two** sub questions (from a, b, c) for Maximum of **18 marks** from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
<b>I : PART - A</b>		<b>10</b>			
I a.	List the characteristics of service systems.	2	L2	CO1	PO1
b.	Illustrate the steps involved in production system design.	2	L1	CO2	PO1
c.	Summarize objectives of master scheduling.	2	L2	CO3	PO1
d.	Discuss the concept of PAC.	2	L1	CO4	PO1
e.	Discuss the different types of material handling equipment.	2	L2	CO5	PO1
<b>II : PART - B</b>		<b>90</b>			
<b>UNIT - I</b>		<b>18</b>			
1 a.	Illustrate the factors affecting productivity.	9	L2	CO1	PO1
b.	Discuss the steps involved in decision making process.	9	L2	CO1	PO1
c.	Old fashioned Berry pies limited, currently operates a single bakery but is not considering a second location in a new shopping mall. The owner estimates that fixed cost would be Rs. 3000 per week and that labour and materials procedure pies at that location will be Rs.60 per pie will be sold for Rs.16 each.	9	L3	CO1	PO2
	i) What number of pies must be sold to break even?				
	ii) What profit would there be on sales of 20000 pies in one week?				
	iii) What volume would be required in order to realize a profit of Rs.12000?				
<b>UNIT - II</b>		<b>18</b>			
2 a.	Why forecasting is needed in an organization? Differentiate between capacity planning and aggregate planning.	9	L2	CO2	PO2

- b. Photo flash company wants to estimate number of cubicles required to maintain an output of 200 good prints per hour. The setup and exposure time can be theoretically done in 2 minutes per print. The operators are 90% efficient and 5% of the prints must be scrapped and redone. If the cubicles can be utilized for enlarging only 75% of the time, determine;
  - i) The required system capacity in prints per hour
  - ii) Average output per hour required
  - iii) Number of cubicles required

9 L3 CO2 PO2

- c. The sales of a product during the last five years are tabulated below. Using linear forecaster , calculate;
  - i) Sales in the year 2018 and 2019
  - ii) Plot the results graphically

9 L3 CO2 PO2

Year	2013	2014	2015	2016	2017
Sales (x 1000)	4	8	6	10	4

**UNIT - III**

**18**

- 3 a. Bata India Ltd. has a master schedule for running shoe production in its facility in lot sizes of 40 pairs of units. The initial inventory has 45 units and demand forecast is 20, 20, 30, 20, 20, 13, 15 and 20 units respectively for eight weeks. The company has received orders for 22 units in week 1, 9 units in 2, 4 units in week 3, 15 units in week 4 and 5 units in week 5. Setup an MPS and find the ATP inventory values for weeks 1 through 8.
- b. A makes Q model from components R.S and T. Component R is made from two units of components X and one unit of components Y. components T is made from one unit of component Y and 3 units of component Z.
  - i) Draw the product structures tree for Q model
  - ii) Using the given information, calculate the gross requirements for each of the components if the company plans to build 100 units of its Q model if you have these inventories: 150 units of component T and 200 units of component R
- c. With the help of flow diagram, explain the MRP and CRP activities.

9 L2 CO3 PO2

9 L3 CO3 PO3

9 L2 CO3 PO1

**UNIT - IV**

**18**

- 4 a. Outline the important guidelines and strategies of scheduling.
- b. With the help of an example, explain the Gantt chart and also explain forward and backward scheduling.

9 L2 CO4 PO1

9 L2 CO4 PO2

- c. Shown below Table 2 are the due dates and processing time remaining for five jobs that were assigned a letter as they arrived. Sequence the jobs by priority rules, i) FCFS ii) EDD iii) LS iv) SPT v) EPT

Table 2: due date and processing time data

Job	Due date	Processing time
A	8	7
B	3	4
C	7	5
D	9	2
E	6	6

9 L3 CO4 PO2

Find out the;

- i) Average completion time      ii) Average job lateness  
 iii) Average number of jobs at work centre for FCFS and SPT

**UNIT - V**

18

- 5 a. Find the sequence for the following eight jobs as shown in Table 3 that minimizes the total elapsed time for completion of all jobs, each job is processed in order CAB. Find the total elapsed time and idle time of each machine.

Table:3 sequence of jobs on machines

Machines	Jobs	1	2	3	4	5	6	7	8
	A	4	6	7	4	5	3	6	2
B	8	10	7	8	11	8	9	13	
C	5	6	2	3	4	9	15	17	

9 L3 CO5 PO2

- b. Use graphical method to minimize the time needed to process the following jobs on the machines shown in Table 4. Also calculate the idle time needed to complete both jobs and best sequence for the jobs.

Table:4 sequence of jobs on machines

Job1	Sequence Time	A	B	C	D	E
		3	4	2	6	2
Job1	Sequence Time	B	C	A	D	E
		5	4	3	2	6

9 L3 CO5 PO2

- c. Five jobs A B C D and E can be processed at any one of the four work centres as shown in Table 5. The process times for each job at each work centre are shown in the matrix. The capacity / number of hours available at each work centre is also indicated by index method of scheduling allocate the jobs to the various work centres.

Table 5: Processing of jobs in different work centres

Job	Work centre			
	1	2	3	4
A	10	9	8	12
B	3	4	5	2
C	25	20	14	16
D	7	9	10	9
E	18	14	16	25
Hours available	15	15	15	20

9 L2 CO5 PO2