

Enrollment No.....



Faculty of Engineering  
End Sem Examination May-2024  
ME3EL19 Operations Management

Programme: B.Tech.

Branch/Specialisation: ME

**Duration: 3 Hrs.****Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

- Q.1 i. Which of the following activities is not a direct responsibility of the operations management? **1**
- (a) Developing an operations strategy for the operations  
(b) Planning and controlling the operations  
(c) Determining the exact mix of products and services that customers will want  
(d) Designing the operations products, services and process
- ii. The Father of Scientific Management is- **1**
- (a) Frank Gilbreth (b) Frederick W. Taylor  
(c) W. Edwards Deming (d) Walther Shewhart
- iii. Which of the following is the first step in making a correct location choice? **1**
- (a) Develop location alternatives  
(b) Decide the criteria for evaluating location alternatives  
(c) Evaluate the alternatives  
(d) Make a decision and select the location
- iv. What does the term "Design for Manufacturability" refer to in product design? **1**
- (a) Designing products that are easy to manufacture  
(b) Designing products for a specific market.  
(c) Designing products with complex features  
(d) None of these
- v. Which of the following is an important consideration in plant layout design? **1**
- (a) Production system (b) Material Handling system  
(c) Operator system (d) Testing system

[2]

- vi. A \_\_\_\_ is a set of activities which are networked in an order and aimed towards achieving the goals of a project. **1**  
 (a) Project (b) Process  
 (c) Material management (d) Project cycle
- vii. Which of the following is the input component(s) to material requirement planning (MRP) system? **1**  
 (a) Bill of material (b) Master production schedule  
 (c) Inventory status file (d) All of these
- viii. Balance delay in assembly line balancing is- **1**  
 (a) 1-Line efficiency  
 (b) 1-Cycle time  
 (c) 1-work station  
 (d) None of these
- ix. How does Kanban prevent work over capacity? **1**  
 (a) By using Work In Progress (WIP) Limit  
 (b) By setting a robust Kanban workflow  
 (c) By having daily meetings about work in progress.  
 (d) By defining explicit policies.
- x. Kaizen refers to \_\_\_\_\_. **1**  
 (a) Continuous improvement  
 (b) Intermittent improvement  
 (c) Discontinuous improvement  
 (d) Stop improvement
- Q.2 i. Write the objectives of operations management. **2**  
 ii. Define the roles and responsibility of operations manager. **3**  
 iii. Explain similarities and difference between goods and services with example. **5**
- OR iv. Explain historical evolution of operations management. **5**
- Q.3 i. What is operation strategy? **2**  
 ii. What do you understand by process strategy? List and explain different types of product strategy. **8**
- OR iii. Explain difference between DFM and DFE. **8**
- Q.4 i. Write the difference between concurrent design and traditional design. **3**  
 ii. In one company, production time available per day is 480 minutes and 40 units are required per day. The data is shown for nine tasks: **7**

[3]

TASK	TIME	PRIORITY OF TASK
A	10	-
B	11	A
C	5	B
D	4	B
E	12	A
F	3	C, D
G	7	F
H	11	E
I	3	G, H
TOTAL TIME	66	

Determine

- I. Identify precedence diagram.  
 II. Calculate-  
 (a) Cycle time  
 (b) Minimum number of workstations,  
 (c) Assign the work elements to workstations  
 (d) Line efficiency
- OR iii. What are PERT and CPM? What is the difference between them? **7**
- Q.5 i. Define MPS. What information is needed to produce a master production schedule? **4**  
 ii. Define purchasing. What is the impact of purchase and material management on the goals of a company? **6**
- OR iii. Define MRP. What are the objectives of MRP? Also explain various input required for MRP. **6**
- Q.6 Attempt any two:  
 i. Explain the concept of “Theory of Constraints (TOC)”. What is Drum - Buffer-Rope (DBR) application of TOC? **5**  
 ii. Explain “Kanban system of JIT” with example. **5**  
 iii. What is lean manufacturing? Write its objectives. **5**

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## Marking Scheme

## Operations Management (T) - ME3EL19 (T)

- Q.1

  - i) Which of the following activities is not a direct responsibility of the operations management?  
**c) Determining the exact mix of products and services that customers will want**
  - ii) The Father of Scientific Management is  
**b) frederick w. taylor**
  - iii) Which of the following is the first step in making a correct location choice?  
**b) Decide the criteria for evaluating location alternatives**
  - iv) What does the term "Design for Manufacturability" refer to in product design?  
**a) Designing products that are easy to manufacture**
  - v) Which of the following is an important consideration in plant layout design?  
**b) Material Handling System**
  - vi) A \_\_\_\_\_ is a set of activities which are networked in an order and aimed towards achieving the goals of a project.  
**a) Project**
  - vii) Which of the following is the input component(s) to material requirement planning (MRP) system?  
**d) All of the options**
  - viii) Balance delay in assembly line balancing is  
**a ) 1-Line Efficiency**
  - ix) How does Kanban prevent work over capacity?  
**a) By using Work In Progress (WIP) Limit.**
  - x) Kaizen refers to \_\_\_\_\_  
**a) Continuous improvement**

Q.2

  - i. Write the objectives of operations Management.  

Objectives
1 Mark for each
  - ii. Define the roles and responsibility of operations manager.  

Roles
1.5 Marks

Responsibility
1.5 Marks
  - iii. Explain similarities and difference between goods and services with example.  

Similarities
2 Marks

Difference
2 Marks

- | OR         | iv.  | Example  | 1 Mark      |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|------------|------|--|-------------|------|------------------|---|----|---|---|----|---|---|---|---|---|---|---|---|----|---|---|---|-------|---|---|---|---|----|---|---|---|-------|------------|----|--|--|---|
|            |      | Explain historical evolution of operations management.   |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | Introduction   | 1 Marks     |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | Pre-industrial revolution  | 1 Marks     | 5    |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | Industrial revolution  | 1 Marks     |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | Scientific management  | 1 Marks     |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | Post-world war   | 1 Marks     |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
| Q.3        | i.   | What is operation strategy?  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | Definition   | 1 Marks     | 2    |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | Strategy   | 1 Marks     |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            | ii.  | What do you understand by process strategy? List and explain different types of product strategy.  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | Process strategy definition  | 2 Marks     | 8    |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | Listing different types of product strategies  | 2 Marks     |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | Explanation of product strategies  | 4 Marks     |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
| OR         | iii. | Explain difference between DFM and DFE.  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | DFM  | -4 Marks    | 8    |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | DFE  | -4 Marks    |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
| Q.4        | i.   | Write the difference between concurrent design and traditional design.   |             | 3    |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | Concurrent design  | - 1.5 Marks |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | Traditional design   | -1.5 Marks  |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            | ii.  | In one company, production time available per day is 480 minutes and 40 units are required per day. The data is shown below for nine tasks.  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | <table border="1"> <thead> <tr> <th>TASK</th><th>TIME</th><th>PRIORITY OF TASK</th></tr> </thead> <tbody> <tr><td>A</td><td>10</td><td>-</td></tr> <tr><td>B</td><td>11</td><td>A</td></tr> <tr><td>C</td><td>5</td><td>B</td></tr> <tr><td>D</td><td>4</td><td>B</td></tr> <tr><td>E</td><td>12</td><td>A</td></tr> <tr><td>F</td><td>3</td><td>C , D</td></tr> <tr><td>G</td><td>7</td><td>F</td></tr> <tr><td>H</td><td>11</td><td>E</td></tr> <tr><td>I</td><td>3</td><td>G , H</td></tr> <tr><td>TOTAL TIME</td><td>66</td><td></td></tr> </tbody> </table> | TASK        | TIME | PRIORITY OF TASK | A | 10 | - | B | 11 | A | C | 5 | B | D | 4 | B | E | 12 | A | F | 3 | C , D | G | 7 | F | H | 11 | E | I | 3 | G , H | TOTAL TIME | 66 |  |  | 7 |
| TASK       | TIME | PRIORITY OF TASK   |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
| A          | 10   | -  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
| B          | 11   | A  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
| C          | 5    | B  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
| D          | 4    | B  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
| E          | 12   | A  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
| F          | 3    | C , D  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
| G          | 7    | F  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
| H          | 11   | E  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
| I          | 3    | G , H  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
| TOTAL TIME | 66   |  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | Determine  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | 1 Identify precedence diagram  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |
|            |      | 2 Calculate  |             |      |                  |   |    |   |   |    |   |   |   |   |   |   |   |   |    |   |   |   |       |   |   |   |   |    |   |   |   |       |            |    |  |  |   |

[2]

- a. Cycle time,
- b. Minimum number of workstations,
- c. Assign the work elements to workstations
- d. Line Efficiency

Precedence diagram - 2 Marks  
 Cycle time = 12 min/unit -1 Marks  
 Minimum no. of workstation = 5.5 or 6 - 1 Marks  
 Assign the work elements to workstations - 1.5 Marks  
 Line efficiency = 91.66% - 1.5 Marks

OR iii. What are PERT and CPM? What is the difference between them?

CPM -1 Marks 7  
 PERT -1 Marks  
 Difference 5 Marks(1 mark for each)

Q.5 i. Define MPS. What information is needed to produce a master production schedule?

Definition - 2 Marks 4  
 Information - 2 Marks

ii. Define purchasing. What is the impact of purchase and material management on the goals of a company?

Definition - 2 Marks 6  
 Impact of purchase 2 Marks  
 Impact of material management 2 Marks

OR iii. Define MRP. What are the objectives of MRP? Also explain various input required for MRP

Definition - 1 Marks  
 Objective - 2 Marks  
 Input explanation - 3 Marks

Q.6 i. Explain the concept of “Theory of Constraints (TOC)”. What is Drum - Buffer-Rope (DBR) application of TOC?

TOC explanation -2.5 Marks 5  
 DBR explanation - 2.5 Marks

ii. Explain “Kanban system of JIT” with example.

Explanation - 3 Marks 5  
 Diagram - 1 Marks  
 Example - 1 Marks

[3]

iii. What is Lean manufacturing? Write its objectives.

Definition - 2 Marks 5  
 Objectives -3 Marks (1 mark for each)

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