

**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025**

Seventh Semester

**Mechanical Engineering**

**20MUOE908 - INTRODUCTION TO INDUSTRIAL ENGINEERING**

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

**PART - A (MCQ) (10 × 1 = 10 Marks)**

Answer ALL Questions

	Marks	K- Level	CO
1. Industrial Engineering mainly focuses on: (a) Designing mechanical components (b) Optimizing systems involving people, materials, and machines (c) Installing electrical control panels (d) Developing chemical reactions for production	1	K1	CO1
2. Which of the following is <i>not</i> a factor affecting productivity? (a) Technology (b) Worker skill level (c) Market share (d) Management practices	1	K1	CO1
3. Which of the following is not a factor affecting plant location? (a) Availability of raw materials (b) Climate (c) Market demand (d) Brand logo design	1	K1	CO2
4. Which plant layout is best suited for mass production? (a) Process layout (b) Product layout (c) Fixed-position layout (d) Combination layout	1	K1	CO2
5. The main purpose of Method Study is to: (a) Reduce machine speed (b) Improve work methods and reduce unnecessary motions (c) Increase workforce size (d) Increase product price	1	K1	CO3
6. Work sampling is mainly used to: (a) Measure anthropometric dimensions (b) Estimate the proportion of time spent on different activities (c) Determine energy expenditure (d) Reduce lighting levels	1	K1	CO3
7. Which control chart is used to monitor the mean of a process? (a) p-chart (b) c-chart (c) $\bar{X}$ -chart (d) np-chart	1	K1	CO4
8. An Operating Characteristic (OC) curve represents the relationship between: (a) Customer demand and production rate (b) Acceptance probability and lot quality (c) Sampling time and cost (d) Process mean and standard deviation	1	K1	CO4
9. Which of the following is a qualitative forecasting technique? (a) Moving average (b) Delphi method (c) Exponential smoothing (d) Regression analysis	1	K1	CO5
10. Economic Batch Quantity (EBQ) is used primarily to: (a) Minimize cost of forecasting (b) Determine optimal batch size for production (c) Measure labour productivity (d) Select the best scheduling method	1	K1	CO5

**PART - B (12 × 2 = 24 Marks)**

Answer ALL Questions

11. Define Industrial Engineering and state its main objective.	2	K1	CO1
12. List any four factors affecting productivity.	2	K1	CO1
13. State any two objectives of plant layout.	2	K1	CO2
14. Define line balancing and mention its purpose.	2	K1	CO2

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| 15. State any two principles of motion economy.   | 2 | K1 | CO3 |
| 16. Define ergonomics and mention one of its applications.                                | 2 | K1 | CO3 |
| 17. Define a control chart and state its purpose.   | 2 | K1 | CO4 |
| 18. What is acceptance sampling? Mention one of its uses.                                 | 2 | K1 | CO4 |
| 19. Define scheduling and state its purpose.  | 2 | K1 | CO5 |
| 20. What is process planning? Mention one of its functions.                               | 2 | K1 | CO5 |
| 21. Define Statistical Quality Control (SQC).   | 2 | K1 | CO4 |
| 22. Differentiate between control charts for variables and control charts for attributes. | 2 | K2 | CO4 |

**PART - C (6 × 11 = 66 Marks)**

Answer ALL Questions

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| 23. a) Summarize in detail the history and development of Industrial Engineering. Explain how the field has evolved from scientific management to modern digital manufacturing systems. | 11 | K2 | CO1 |
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| b) Explain the concept of Productivity. Discuss the various kinds of productivity measures and suggest methods to improve productivity in an industrial setup. | 11 | K2 | CO1 |
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| 24. a) Explain the various types of plant layout with suitable examples. | 11 | K2 | CO2 |
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| b) Write the plant layout procedure in detail and explain the methods of plant and facility layout. | 11 | K2 | CO2 |
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| 25. a) Explain the Method Study procedure in detail and describe how it helps in improving work efficiency. | 11 | K2 | CO3 |
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| b) Describe ergonomics in detail, including its major areas of application. Discuss physical workload, anthropometry, and the design considerations for sitting and standing postures. | 11 | K2 | CO3 |
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| 26. a) Explain in detail the control charts for variables and attributes. Include chart types, construction, and applications. | 11 | K2 | CO4 |
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| b) Write Acceptance Sampling in detail. Explain the OC curve, single sampling plan, and double sampling plan with advantages and limitations. | 11 | K2 | CO4 |
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| 27. a) Explain the different forecasting techniques and discuss their applications in production planning. | 11 | K2 | CO5 |
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| b) Explain the concepts of types of production, Economic Batch Quantity (EBQ), and the procedures of loading and scheduling in production control. | 11 | K2 | CO5 |
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| 28. a) Explain the concepts of Producer's Risk ( $\alpha$ ) and Consumer's Risk ( $\beta$ ) in acceptance sampling. Describe their significance with the help of an O.C. curve. | 11 | K2 | CO4 |
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| b) Compare Single Sampling Plan and Double Sampling Plan. Explain with examples their working, advantages, and limitations. | 11 | K2 | CO4 |
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