C–5914

Sub. Code
60415/ 60515/ 60615

B.Voc. DEGREE EXAMINATION, NOVEMBER 2025.

First Semester

PRODUCTION TECHNOLOGY

(Common for Industrial Automation/ Manufacturing Technology/Production Technology)

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. What is the primary function of cutting fluids in metal cutting?

   (a) Increase tool wear

   (b) Reduce friction and heat generation

   (c) Increase cutting force

   (d) Reduce tool life

2. Which type of chip is typically formed in ductile material machining?

   (a) Continuous chip

   (b) Discontinuous chip

   (c) Built-up edge chip

   (d) Serrated chip

3. What is the main function of a turret lathe?

(a) Thread rolling

(b) Automatic tool changing

(c) Surface finishing

(d) Grinding

4. Which tool is primarily used for creating internal threads?

(a) Reamer (b) Tap

(c) Drill bit (d) End mill

5. Which machining process is used for shaping metal with reciprocating motion?

(a) Milling (b) Shaping

(c) Turning (d) Grinding

6. What is the purpose of broaching in machining?

(a) Surface finishing

(b) Internal machining with single-pass cutting

(c) Thread cutting

(d) Boring

7. Which abrasive material is commonly used in grinding wheels?

(a) Diamond (b) High-speed steel

(c) Titanium (d) Tungsten carbide

8. What is the primary advantage of ultrasonic machining?

(a) High material removal rate

(b) High accuracy and surface finish

(c) High temperature machining

(d) Increased tool wear

9. Which machining process uses an electrically conductive tool to remove material?

(a) Electrochemical machining
(b) Water jet machining
(c) Laser beam machining
(d) Ultrasonic machining

10. What is the key advantage of laser beam machining?

(a) Contact machining
(b) Low energy consumption
(c) High precision and micro-machining capability
(d) High tool wear

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain the mechanics of orthogonal cutting with suitable diagrams.

Or

(b) Discuss the significance of tool wear and failure in machining operations.

12. (a) Describe the working principle and applications of turret lathes.

Or

(b) Explain the design considerations for drilling, reaming, and tapping.

13. (a) Illustrate the different milling operations with suitable sketches.

Or

(b) Discuss the gear manufacturing process by machining.

14. (a) Explain the grinding process and the role of grinding fluids.

Or

(b) Discuss the economics of grinding and finishing operations.

15. (a) Explain the working principle of wire electric discharge machining.

Or

(b) Discuss the advantages and limitations of laser beam machining.

Part C (5 × 8 = 40)

Answer **all** questions, choosing either (a) or (b).

16. (a) Elaborate on the mechanics of chip formation and the types of chips formed during machining.

Or

(b) Discuss the factors influencing cutting tool life and their effect on machining performance.

17. (a) Explain in detail the working and applications of capstan and turret lathes.

Or

(b) Discuss in depth the process of automatic screw machining.

18. (a) Describe the working principle and advantages of broaching machines.

Or

(b) Explain the different types of shaping machines and their applications.

19. (a) Discuss in detail the various types of abrasive machining operations.

Or

(b) Explain the importance of deburring and finishing operations in machining.

20. (a) Explain the principles and applications of electrochemical machining.

Or

(b) Discuss the significance of ultra-precision machining in modern manufacturing.

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C–5920	Sub. Code 60531

B.Voc. DEGREE EXAMINATION, NOVEMBER 2025

Third Semester

Manufacturing Technology

INTRODUCTION TO DIGITAL MANUFACTURING

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. Which system is used to simulate and optimize the layout of a factory?

   (a) ERP

   (b) PLM

   (c) Factory Layout Planning Software

   (d) CAPP

2. Which software is primarily used for designing a product in digital manufacturing?

   (a) ERP

   (b) CAD

   (c) PLM

   (d) CAM

3. Which of the following technologies is crucial for achieving the goals of Industry 4.0?

(a) Typewriters

(b) Steam engines

(c) Augmented Reality (AR)

(d) Morse code communication

4. In Industry 4.0, what is meant by the term "smart factory"?

(a) A factory with only human workers

(b) A facility without production capabilities

(c) A manually controlled production line

(d) A factory with interconnected systems, automation, and data-driven processes

5. Which technology is transforming the design, production, and logistics processes by enabling real-time simulation and feedback?

(a) Traditional manufacturing tools

(b) Pneumatic systems

(c) Augmented Reality (AR) and Virtual Reality (VR)

(d) Analog communication

6. How are collaborative robots (cobots) utilized in logistics?

(a) For manual transportation of goods

(b) For automating material handling and optimizing warehouse operations

(c) For replacing IoT-based systems

(d) For reducing data usage in logistics

7. Collaborative robots, or cobots, are primarily designed to :

(a) Operate entirely independently of human workers B.C.D.

(b) Work alongside humans to enhance efficiency and safety

(c) Replace all automation systems

(d) Limit production capabilities

8. Virtual reality (VR) in the industry is mainly used for

(a) Training workers in a simulated environment

(b) Conducting manual maintenance

(c) Removing digital interfaces

(d) Replacing physical factories

9. Control algorithms in smart part logistics are primarily used for :

(a) Enhancing manual labor efficiency

(b) Automating and optimizing the movement of parts and materials

(c) Managing physical paperwork

(d) Reducing the need for digital systems

10. Which of the following is a major challenge of digital transformation in manufacturing?

(a) Excessive reliance on traditional tools

(b) Complete elimination of manual processes

(c) High costs of implementation and resistance to change

(d) Limited availability of advanced technologies

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Discuss the concept of digital manufacturing and its significance in modern industrial processes.

Or

(b) Explain the role of CAD (Computer-Aided Design) and CAM (Computer-Aided Manufacturing) in the product design and production lifecycle.

12. (a) Define Industry 4.0 and explain how it represents a paradigm shift in manufacturing.

Or

(b) Discuss the main components of Industry 4.0, such as IoT, AI, CPS, and Big Data.

13. (a) Discuss the concept of additive manufacturing and its significance in enabling on-demand production of personalized goods.

Or

(b) Explain how IoT enables self-configuration and self-diagnosis in manufacturing systems.

14. (a) Analyze the role of machine learning in manufacturing processes.

Or

(b) Examine the use of artificial intelligence (AI) in manufacturing.

15. (a) Discuss how real-time data, IoT, and AI transform supply chain operations.

Or

(b) Explain the role of control algorithms in smart part logistics.

Part C $(5 \times 8 = 40)$

Answer **all** questions, choosing either (a) or (b).

16. (a) Elaborate on the significance of ergonomics in digital manufacturing.

Or

(b) Discuss the importance of production process simulation in digital manufacturing. How does it help in identifying and resolving potential issues in production systems?

17. (a) What are the design principles of Industry 4.0? Explain how these principles contribute to the success of smart factories.

Or

(b) Describe the building blocks of the fourth industrial revolution.

18. (a) Describe the impact of big data analysis on reconfigurable manufacturing systems.

Or

(b) Explore the role of virtual reality (VR) in manufacturing.

19. (a) Define collaborative robots (cobots) and discuss their role in production environments.

Or

(b) Evaluate the impact of cobots in the logistics sector. How do they enhance efficiency, safety, and productivity in material handling and warehouse operations?

20. (a) Evaluate the importance of advanced technologies like IoT, blockchain, and big data analytics in building and managing smart supply chains.

Or

(b) What strategies can companies employ to integrate smart supply chain systems with minimal disruption to existing operations? Discuss the role of leadership and change management.

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