C–4490	Sub. Code 60526

B.Voc. DEGREE EXAMINATION, APRIL 2025.

Second Semester

Manufacturing Technology

QUALITY ENGINEERING

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. What is a quality cost?

   (a) The cost of raw materials used in manufacturing

   (b) The cost incurred from producing low-quality products or services

   (c) The cost of employee training

   (d) The cost of marketing and advertising products

2. Which of the following is NOT a definition or dimension of quality?

   (a) Conformance to specifications

   (b) Fitness for use

   (c) Product aesthetics

   (d) Employee compensation

3. Which of the following is a reason to benchmark an organization's processes?

   (a) To identify weaknesses in an organization's financial reporting

   (b) To understand competitors' business strategies

   (c) To identify areas for improvement based on industry best practices

   (d) To evaluate the quality of marketing campaigns

4. What does FMEA stand for in quality management?

   (a) Failure Model and Evaluation Analysis

   (b) Failure Modes and Effect Analysis

   (c) Fault Management and Engineering Analysis

   (d) Functional Modes and Evaluation Approach

5. What is the focus of ISO 9001 requirements?

   (a) Environmental sustainability

   (b) Standardizing financial processes

   (c) Establishing a quality management system for continuous improvement

   (d) Increasing product diversity

6. Which concept is at the core of ISO 14001 environmental management systems?

   (a) Financial sustainability

   (b) Continuous improvement of environmental performance

   (c) Standardization of employee behavior

   (d) Minimizing market competition

7. Which of the following is considered a basic element of Lean Manufacturing?

(a) Maximizing inventory

(b) Reducing the number of suppliers

(c) Just-in-time production

(d) Increasing product variety

8. Which of the following is NOT typically part of the Lean Manufacturing toolset?

(a) Kanban

(b) Kaizen

(c) Total Quality Management

(d) SWOT analysis

9. Which tool is commonly used in Six Sigma to identify the root causes of defects?

(a) Fishbone diagram

(b) Gantt chart

(c) Kanban board

(d) SWOT analysis

10. In the define phase of DMAIC, what is typically done?

(a) Data is collected and analysed

(b) Improvement actions are implemented

(c) The problem is defined and project goals are set

(d) The process is standardized

Part B (5 × 5 = 25)

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

11. (a) Explain the key components of the TQM framework.

Or

(b) Identify and discuss the common barriers to successfully implementing TQM in an organization.

12. (a) Explain the benchmarking process in detail.

Or

(b) Explain How does FMEA help in identify potential failures in products or processes and mitigating risks?

13. (a) Describe the process of implementing a Quality Management System (QMS) in an organization.

Or

(b) Explain the role and importance of internal audits in maintaining an effective Quality Management System (QMS).

14. (a) Describe the core principles of Lean Manufacturing.

Or

(b) Discuss the process of transitioning from a conventional manufacturing setup to a Lean Manufacturing system.

15. (a) Explain the roles and responsibilities associated with each Six Sigma belt level.

Or

(b) Discuss the similarities and difference between Lean Manufacturing and Six Sigma.

Part C (5 × 8 = 40)

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

16. (a) Describe the key principles of total operations management (TOM).

Or

(b) Explain the concept of continuous process improvement within the context of TQM.

17. (a) Explain the concept of quality function deployment (QFD).

Or

(b) Discuss Taguchis quality loss function and its significance in quality management.

18. (a) Discuss the steps involved in the ISO 9001 registration and certification process. Explain the process of auditing, documentation review, and registration by a certification body.

Or

(b) Discuss the role of EMS - in promoting sustainability and reducing environmental harm.

19. (a) Explain the role of continuous improvement (Kaizen) in Lean Manufacturing.

Or

(b) Assess the impact of specific Lean manufacturing tools in achieving operational excellence.

20. (a) What are the key benefits of adopting Six Sigma in an organization? Discuss any limitations or challenges that might arise during its implementation, particularly in non-manufacturing environments.

Or

(b) Explain various main tools used in Six Sigma to identify defects and improve processes?

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C–4491	Sub. Code 60531

B.Voc. DEGREE EXAMINATION, APRIL 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 of the following is a driver for digital transformation?

   (a) Manual labor (b) CAD

   (c) PLM systems (d) Ergonomics

2. What is the primary focus of CAM software?

   (a) Factory layout planning

   (b) Production process simulation

   (c) Offline robot programming

   (d) Computer-Aided Manufacturing

3. Which of the following is NOT a component of Industry 4.0?

   (a) Internet of Things

   (b) Big Data

   (c) Manual Processing

   (d) Cyber-Physical Systems

4. What principle is central to Industry 4.0?

(a) Mass production

(b) Automation

(c) Decentralized decision-making

(d) Manual assembly

5. Which technology is primarily used for on-demand production of personalized goods?

(a) Collaborative robots

(b) Additive Manufacturing

(c) Machine Learning

(d) Big Data Analysis

6. What is the primary role of collaborative robots in digital manufacturing?

(a) Design (b) Production

(c) Logistics (d) All of the above

7. Smart supply chains are most associated with which of the following?

(a) Traditional logistics

(b) Control algorithms

(c) Manual management

(d) Offline robot programming

8. Which is a significant challenge in digital transformation?

(a) Availability of manual labor

(b) Digital infrastructure

(c) Traditional business models

(d) Factory layout planning

9. Which external organization is likely to support digital manufacturing needs?

(a) Local manual labor agencies

(b) Automation equipment suppliers

(c) Traditional logistics firms

(d) All of the above

10. Which of the following best describes the focus of future digital manufacturing?

(a) Manual control systems

(b) Automated production

(c) Smart part logistics

(d) Offline robot programming

Part B $(5 \times 5 = 25)$

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

11. (a) Explain the role of CAD and CAM software in Digital Manufacturing.

Or

(b) Discuss the importance of Production Process Simulation in Digital Manufacturing.

12. (a) Describe the key components of Industry 4.0.

Or

(b) Explain the design principles that guide the fourth industrial revolution.

13. (a) What are the emerging trends in additive manufacturing technologies?

Or

(b) Discuss the role of machine learning and artificial intelligence in manufacturing processes.

14. (a) How do control algorithms contribute to smart supply chains?

Or

(b) Explain the challenges faced in digital transformation within the manufacturing industry.

15. (a) Discuss the new business models emerging in the era of digital manufacturing.

Or

(b) Describe how augmented reality is being utilized in modern manufacturing processes.

Part C (5 × 8 = 40)

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

16. (a) Discuss the impact of PLM systems on the digital transformation of manufacturing.

Or

(b) Explain the significance of offline robot programming in modern manufacturing processes.

17. (a) Analyze the differences between today's factories and Industry 4.0 factories.

Or

(b) Evaluate the role of government initiatives in the adoption of Industry 4.0.

18. (a) Examine the use of big data analysis for reconfigurable manufacturing systems.

Or

(b) Discuss how self-configuration and self-diagnosis are enabled by IoT in manufacturing.

19. (a) Describe the future of digital manufacturing in terms of smart supply chains and their control algorithms.

Or

(b) Analyze the challenges and potential solutions in digital transformation.

20. (a) Evaluate the role of collaborative robots in production, design and logistics.

Or

(b) Discuss the additional resources and external organizations that support digital manufacturing needs.

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C–4492	Sub. Code 60541

B.Voc. DEGREE EXAMINATION, APRIL 2025.

Fourth Semester

Manufacturing Technology

MODERN MACHINING PROCESSES

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. Which unconventional machining process is based on material removal through mechanical abrasion?

   (a) Ultrasonic Machining (USM)

   (b) Plasma Arc Machining (PAM)

   (c) Electrochemical Machining (ECM)

   (d) Laser Beam Machining (LBM)

2. Which of the following processes is most suitable for machining materials that are electrically conductive?

   (a) Chemical Machining (CHM)

   (b) Electrical Discharge Machining (EDM)

   (c) Ultrasonic Machining (USM)

   (d) Abrasive Water Jet Machining (AWJM)

3. What is the working principle of Abrasive Jet Machining (AJM)?

(a) High-speed jets of water are used to remove material from the workpiece

(b) A mixture of abrasive particles and gas is directed at the workpiece to erode it

(c) A high-frequency sound wave is used to generate mechanical vibrations on the workpiece.

(d) A laser beam is used to melt and vaporize the material from the work piece

4. In Water Jet Machining (WJM), what is used as the cutting medium?

(a) A mixture of water and abrasive particles

(b) A stream of compressed air

(c) A high-pressure water stream

(d) High-frequency sound waves

5. Which type of EDM is typically used for making precise cuts in thin sections or intricate shapes?

(a) Sink EDM

(b) Wire Cut EDM

(c) Ultrasonic EDM

(d) Laser EDM

6. Which of the following components is part of the power and control circuits in Electric Discharge Machining (EDM)?

(a) Ultrasonic transducer

(b) Pulse generator and capacitor

(c) High-pressure pump

(d) Rotary spindle motor

7. What is the primary mechanism for material removal in chemical machining(CHM)?

(a) Thermal energy

(b) Mechanical energy

(c) Chemical reactions

(d) Electrostatic forces

8. Which of the following is commonly used as an etchant in chemical machining?

(a) Sulfuric acid (b) Ferric chloride

(c) Water (d) Ethanol

9. What is the working medium in Plasma Arc Machining (PAM)?

(a) Gas ionized to create plasma

(b) Liquid electrolyte

(c) Focused light beam

(d) Electric current

10. Which parameter is most critical in controlling the quality of a laser beam machining process?

(a) Wavelength of the laser

(b) Current intensity

(c) Workpiece temperature

(d) Pulse repetition rate

Part B (5 × 5 = 25)

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

11. (a) Explain the need for unconventional machining processes in modern manufacturing.

Or

(b) Discuss the classification of unconventional machining processes.

12. (a) Describe the combined process of Abrasive Water Jet Machining (AWJM).

Or

(b) Describe the working principle of Ultrasonic Machining (USM).

13. (a) Discuss the role and importance of the dielectric fluid in EDM.

Or

(b) Describe the various process parameters in EDM.

14. (a) Explain the principles of chemical machining (CHM).

Or

(b) Describe the process of applying maskants in chemical machining.

15. (a) Enlist the principle of Laser Beam Machining (LBM).

Or

(b) Explain the primary components of a Laser Beam Machining (LBM) setup?

Part C (5 × 8 = 40)

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

16. (a) Describe the working principle of Electrical Discharge Machining (EDM).

Or

(b) Discuss how ultrasonic waves are used to remove material.

17. (a) Explain the working principle of Abrasive Jet Machining (AJM) and describe the types of materials that can be effectively machined using this process.

Or

(b) Discuss the operation of Water Jet Machining (WJM).

18. (a) Analyze the challenges associated with tool wear in EDM.

Or

(b) Compare the capabilities and limitations of conventional EDM (sink EDM) and Wire Cut EDM.

19. (a) Compare and contrast chemical machining (CHM) and electrochemical machining (ECM).

Or

(b) Analyze the role of surface finish in CHM and ECM.

20. (a) Justify why is a vacuum environment necessary in Electron Beam Machining (EBM)?

Or

(b) Analyze the beam control techniques used in Laser Beam Machining (LBM), Plasma Arc Machining (PAM), and Electron Beam Machining (EBM). How do these techniques impact the precision and quality of the final product?

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C–4493	Sub. Code 60546

B.Voc. DEGREE EXAMINATION, APRIL 2025.

Fourth Semester

Manufacturing Technology

PROFESSIONAL ETIQUETTES

(2023 onwards)

Duration : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** questions.

1. Which of the following is considered a breach of workplace etiquette?

   (a) Offering a handshake to new colleague

   (b) Keeping your desk organized and tidy

   (c) Sending a thank-you email after an interview

   (d) Speaking loudly on the phone in a shared workspace

2. When attending a business lunch, it's important to

   (a) Talk only about business and avoid personal topics

   (b) Be on your best manners and respect the host's choices

   (c) Arrive late to avoid interrupting the meeting

   (d) Focus on eating rather than the conversation

3. In the context of emails, what does BCC stand for

(a) Basic Copy Contact

(b) Blind Carbon Copy

(c) Back Carbon Copy

(d) Bulk Copy Contact

4. How should you handle a difficult or frustrating telephone call?

(a) Ignore the caller's concerns

(b) Argue with the caller to resolve the issue

(c) Hang immediately

(d) Stay calm, listen carefully and offer assistance

5. What is the appropriate way to greet someone in a formal meeting?

(a) Hugging them

(b) Offering a firm handshake and introducing yourself

(c) Giving a high-five

(d) Waving from across the room

6. What is considered polite behavior during a business meeting?

(a) Listening attentively and avoiding distractions

(b) Speaking over others frequently

(c) Using your phone for texting during the meeting

(d) Talking without letting anyone else speak

7. During a job interview, how should you greet the interviewer

   (a) With a handshake, firm and confident and a smile

   (b) With a quick nod and no handshake

   (c) By sitting down immediately without greeting

   (d) By giving a casual "hello" without making eye contact

8. During a job interview, when should you ask questions

   (a) At the beginning of the interview

   (b) Only at the end of the interview

   (c) Interrupting the interviewer when necessary

   (d) Never ask questions, as it's unnecessary

9. In multi-cultural environments, when meeting new people, it is best to

   (a) Use informal greetings with everyone

   (b) Assume that everyone prefers a handshake

   (c) Use the same greeting for everyone, regardless of their background

   (d) Observe and adapt to the cultural norms and greetings of the people you're meeting

10. What is the most important factor when giving a presentation?

   (a) Speaking quickly to cover more material

   (b) Ensuring content is relevant and engaging

   (c) Using complicated vocabulary

   (d) Reading directly from your slides without engaging the audience

Part B (5 × 5 = 25)

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

11. (a) Discuss the importance of effective communication in a professional setting and the role of etiquette in ensuring clear communication.

Or

(b) Describe how to handle conflicts or disagreements, punctuality in the workplace in a professional manner.

12. (a) List four key components of a professional email.

Or

(b) How should you leave a voicemail message professionally? Provide a sample message.

13. (a) Discuss on American and continental styles of eating.

Or

(b) Outline the duties of a chairperson for conducting a meeting.

14. (a) Brief on different types of interviews.

Or

(b) Define public speaking etiquette and explain its importance.

15. (a) Enlist the importance of colour scheme, font size, content requirement for a presentation.

Or

(b) Highlight the common mistakes made during the presentations.

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

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

16. (a) What are the key elements of proper business attire in a workplace? Explain how dressing appropriately can impact your professional image and career progression.

Or

(b) How would you apply office party etiquette to ensure professionalism while socializing with colleagues?

17. (a) Compare and contrast email and telephone etiquette in professional communication.

Or

(b) Why is it important to respond promptly in both emails and telephone conversations? Discuss.

18. (a) Imagine you are hosting a formal meeting followed by a dinner. Describe how you would prepare for both events.

Or

(b) Summarize and explain the importance of international dining etiquettes.

19. (a) Brief on steps to be followed preparation for an interview, interview attire and checklist.

Or

(b) Discuss the importance of tone and body language in public speaking and how they influence audience perception.

20. (a) Enumerate the importance of cultural differences and their effects in business etiquette.

Or

(b) Highlight the importance of effective presentations which are made through body language, confidence and eye contact.

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