

QUESTION BANK

S8 ME

DEPT. OF MECHANICAL ENGINEERING | VASTTC

| CODE: MET 476 | COURSE NAME: CRYOGENIC ENGINEERING | Credit:3 | |
|------------------------------|---|-----------------------------|--------------|
| Q.No | Module I | Month & Year | Marks |
| 1 | Discuss the applications of cryogenics in aerospace (any two) and medicine (any three). | Dec-20 | 5 |
| | Explain two applications of superconductivity | Sep-20 | 2 |
| | Explain the application of cryogenics in the field of electronics | Sep-20 | 5 |
| | Discuss the applications of Cryogenics Engineering. | Oct-23 | 14 |
| | Explain super conductivity and list any two applications of super conductivity. | Jun-23 | 8 |
| | Explain the applications of cryogenics. | Aug-24 | 3 |
| 2 | What are the major developments (at least five) in the field of cryogenics during the last 160 years? Explain those developments, which have significant industrial applications? | Aug-21 | 5 |
| 3 | Explain Mechanical properties of Metals and Plastics at low temperature | Oct-23 | 14 |
| | Describe in detail the variation of mechanical properties of various materials at cryogenic temperatures | Sep-20 | 5 |
| | Explain the variation of any two mechanical, any two thermal and any one electrical properties of materials at cryogenic temperatures. | Jun-23 | 14 |
| | Show how the ultimate strength of the material varies at cryogenic temperature. | Oct-23 | 3 |
| | Explain mechanical properties of materials at low temperature. | May-24 | 6 |
| | Explain the temperature dependence of the mechanical properties of solids, which are of significance in cryogenic engineering. | Dec-20 | 6 |
| 4 | Draw the Pressure-Temperature diagram of He-4 and indicate the salient points in the diagram. | Dec-20 | 5 |
| 5 | Sketch the variation of liquid specific heat with temperature for He-4. | Aug-21 | 2 |
| 6 | Explain (a) Fountain effect (b) Mechanocaloric effect | Dec-20 | 4 |
| 7 | Differentiate Type I and Type II superconductors mentioning their applications. | Sep-20 | 2 |
| | What is (1) superconductivity, (2) Meissner effect, (3) Type I and Type II superconductors? Which theory successfully explained the phenomenon of superconductivity (up to 23 K). | Aug-21 | 5 |
| 8 | Explain Meissner effect and mention its significance? | Sep-20 | 3 |
| 9 | Why Stainless steel is one of the best material for the cryogenic applications? | Jun-23 | 6 |
| | Why thermal expansion/contraction is important in Cryogenic Engineering? | Jun-23 | 3 |
| 10 | Differentiate between ortho hydrogen and para hydrogen? | May-24 | 6 |
| Q.No | Module II | Month & Year | Marks |
| 1 | With neat sketches explain the critical components used in cryogenic liquefaction system. | Oct-23 | 14 |
| | Draw the T-s diagram of an ideal liquefaction system. | Oct-23 | 3 |
| | With sketches, explain the different critical components present in gas liquefaction systems. | Sep-20 | 6 |
| | Discuss the ideal liquefaction system and derive an expression for minimum work required to liquefy the gases. | Aug-21 | 6 |
| 2 | Explain Joule Thomson coefficient. Mention its significance. | Sep-20 | 4 |
| | Explain Joule-Thompson expansion and adiabatic expansion. What is the advantage of adiabatic expansion? | Dec-20 | 6 |

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| | Explain Joule-Thompson effect. | Oct-23 | 3 |
| | Explain the significance of inversion temperature for gases. | Jun-23 | 3 |
| | Illustrate Joule-Thompson effect. Show the inversion curve of a real gas on a T-P diagram. | Aug-24 | 7 |
| 3 | Explain the simple Linde- Hampson liquefaction system. Derive expressions for liquid yield, work requirement per unit mass liquified, and FOM. | Dec-20 | 8 |
| | Why the simple Linde-Hampson system cannot be used for liquefaction of Helium, Neon, and Hydrogen? | Dec-20 | 2 |
| | Explain the limitations of Simple Linde-Hampson cycle which makes it inefficient for the liquefaction of Neon, Hydrogen and Helium. | Sep-20 | 4 |
| | Explain Simple Linde – Hampson system with sketches and T-s diagram | Oct-23 | 14 |
| | Explain the working of simple Linde-Hampson liquefaction system. Derive an expression for liquid yield and the work required for a unit mass of gas liquefied. | Aug-24 | 14 |
| | Discuss the consequences of operating the simple Linde- Hampson liquefaction system with a gas having maximum inversion temperature below the atmospheric temperature | Aug-21 | 4 |
| 4 | Explain pre-cooled Linde-Hampson system for the liquefaction of gases with a neat sketch and T-s diagram? | Jun-23 | 14 |
| | Explain the working of precooled Linde-Hampson system with schematic diagram | May-24 | 14 |
| | Explain the advantages and limitations of pre cooled Linde Hampson cycle? | Sep-20 | 4 |
| 5 | Compare Claude Liquefaction system and Linde Hampson Liquefaction system | Sep-20 | 6 |
| 6 | Explain the Claude liquefaction system. Derive expressions for liquid yield, work requirement per unit mass liquified, and FOM. | Aug-21 | 8 |
| | Explain the liquid Nitrogen precooled Claude system for the liquefaction of Neon or Hydrogen. Derive expressions for liquid yield, work requirement per unit mass liquified, and FOM. Assume that the expansion work output is used to provide part of the compressor work requirement. | Dec-20 | 10 |
| | Explain Claude system for the liquefaction with T-s diagram? | Jun-23 | 9 |
| | Explain Claude liquefaction system with a neat sketch and T-s diagram. | May-24 | 14 |
| 7 | Difference between Refrigerator and Liquefier. | Jun-23 | 3 |
| 8 | With the help of diagrams, explain the Collins helium liquefier | Aug-21 | 4 |
| 9 | Write a short note on the isentropic expansion coefficient. | Aug-21 | 4 |
| 10 | With the help of diagrams, explain the Simon helium liquefier. Derive an expression for liquid yield in Simon helium liquefier. | Dec-20 | 5 |
| 11 | With a suitable example, discuss the effect of heat exchanger effectiveness on the performance of liquefiers | Aug-21 | 6 |
| 12 | Explain the working of Stirling cryocoolers with the help of neat diagrams. | Sep-20 | 6 |
| 13 | Show that an ideal gas would not experience a temperature change on undergoing an expansion through an expansion valve. | Aug-24 | 7 |
| Q.No | Module III | Month & Year | Marks |
| 1 | Discuss the classification of cryocoolers. Discuss some applications of cryocoolers. | Aug-21 | 5 |
| | List the basic requirements of a Cryocooler. | Oct-23 | 3 |
| | Depending on the end use application, write 3 basic requirements have to be satisfied by a Cryocooler. | Jun-23 | 3 |
| 2 | Explain ideal isothermal system for cryogenic refrigeration. | Jun-23 | 3 |

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| | Why regenerators are used in cryogenic refrigeration systems? Substantiate your answer with suitable reasons. | Jun-23 | 8 |
| | | Oct-23 | 8 |
| 3 | Discuss, with a suitable example, the effect of regenerator effectiveness on the performance of a cryogenic refrigerator. | Dec-20 | 6 |
| 4 | Explain the significance of thermal valves in cryogenic refrigeration systems | Sep-20 | 3 |
| | Derive an expression for COP of a thermodynamically ideal isobaric source cold-gas refrigerator. | Aug-21 | 5 |
| | Explain thermodynamically ideal isobaric source refrigeration system | Sep-20 | 4 |
| | Describe the ideal isobaric source refrigeration cycle with a neat sketch. | Aug-24 | 4 |
| 5 | Explain Philips refrigerator. Derive an expression for COP of Philips refrigerator | Aug-21 | 6 |
| | Illustrate the working of Philips refrigerator with a neat sketch. | Jun-23 | 7 |
| | Explain the working of Philip's refrigerator with T-s diagram. Derive an expression for its COP. | Aug-24 | 7 |
| 6 | Illustrate the working of Gifford-McMahon refrigerator with a neat sketch. | Jun-23 | 7 |
| | Explain Gifford McMahon refrigerators. | Aug-24 | 7 |
| 7 | Illustrate the working of Linde-Hampson refrigerator with a neat sketch. | Oct-23 | 7 |
| 8 | Explain the working of a stirling cycle refrigeration system. | Sep-20 | 4 |
| 9 | Explain adiabatic demagnetisation process with the help of neat diagram. | Sep-20 | 6 |
| | Explain the adiabatic demagnetization process with a neat sketch? | Oct-23 | 6 |
| 10 | Explain Magnetic refrigerators. | Aug-24 | 7 |
| | | Jun-23 | 6 |
| 11 | Explain the working of a Vuilleumier refrigerator. Derive an expression for COP of a Vuilleumier refrigerator | Sep-20 | 6 |
| 12 | With the help of a T-s diagram explain working of a Simon Helium liquefier. | Sep-20 | 7 |
| 13 | Draw the schematic diagram of a regenerative heat exchanger. | Oct-23 | 3 |
| 14 | Explain the working of a cryogenic refrigerator capable of achieving temperature below 1K | Aug-21 | 4 |
| Q.No | Module IV | Month & Year | Marks |
| 1 | Explain with the help of a diagram, a typical storage vessel for a cryogenic liquid. | Dec-20 | 10 |
| | Explain with the help of a diagram, a typical storage vessel for a cryogenic liquid. What are the factors to be considered, while designing such a vessel? | Aug-21 | 10 |
| | With a neat sketch, explain the functions of the various elements of a Dewar vessel. | Sep-20 | 10 |
| 2 | Explain different types of cryogenic insulation materials and compare their performance | Dec-20 | 6 |
| | What are the factors to be considered for selecting insulation for a particular application? | Dec-20 | 4 |
| | Explain the different types of insulations used for cryogenic containers and transfer lines. Explain clearly the considerations in the choice of a particular insulation system for a specific application | Aug-21 | 10 |
| | Explain the different types and use of insulations in space applications. | Sep-20 | 8 |
| | Describe a typical multi -layer insulation. | Sep-20 | 2 |
| | List out various types of insulation used in cryogenics. Explain each of them and also mention their pros and cons. | Oct-23 | 14 |
| | Classify and explain various types of insulation used in cryogenics. | Jun-23 | 14 |
| Classify and explain insulation systems used in Cryogenic applications. | Aug-24 | 14 | |
| 3 | Explain rotary vane pump used in Cryogenics with neat sketch | Oct-23 | 8 |

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| | Classify and explain Cryo pumps used in Cryogenic applications. | | |
| 4 | Explain the features of cryogenic fluid transfer systems | Dec-20 | 10 |
| | | Aug-21 | 10 |
| | Briefly explain the cryogenic fluid transfer system. | Sep-20 | 10 |
| 5 | With neat sketches explain any one gas separation system. | Oct-23 | 6 |
| | Explain ideal gas separation system. | Jun-23 | 7 |
| | Differentiate between adsorption and absorption | Aug-24 | 4 |
| | Differentiate between Adsorption and Absorption. | Oct-23 | 3 |
| | What are the common techniques used for gas separation? | Jun-23 | 3 |
| 6 | Explain with neat sketch, Temperature Composition Diagram to estimate the composition of vapor and liquid phase in gas separation process. | May-24 | 8 |
| 7 | Explain Gibbs phase rule with T-s diagram | Jun-23 | 7 |
| 8 | Classify vacuum pumps. | Jun-23 | 3 |
| Q.No | Module V | Month & Year | Marks |
| 1 | Explain any two temperature measurement devices used in cryogenics with suitable sketches? | Oct-23 | 14 |
| | Explain the measurement of temperature using 1. Resistance thermometer 2. Magnetic thermometer. | Dec-20 | 10 |
| | Explain the measurement of temperature using 1. Vapour pressure thermometer 2. Magnetic thermometer. | Aug-21 | 10 |
| | Explain any two temperature measurement system used in cryogenics with suitable sketches? | Jun-23 | 14 |
| | Explain temperature measurement by RTD. | Aug-24 | 7 |
| | Explain different temperature measuring techniques used in cryogenic applications. | Sep-20 | 6 |
| 2 | Explain with the help of diagrams any two methods of cryogenic liquid level measurement | Dec-20 | 10 |
| | Write a note on liquid level gauges (any two) used in cryogenic engineering. | Aug-21 | 10 |
| | Describe the working of hydro-static liquid level gauge. | Jun-23 | 3 |
| | List liquid level measurement system used in Cryogenics. | Oct-23 | 3 |
| | Describe the methods of liquid level measurement in cryogenic applications. | Aug-24 | 14 |
| 3 | Briefly explain the working of a McLeod gauge. | | |
| | Explain the working of McLeod gauge and Pirani gauge | Oct-23 | 14 |
| | Explain any two pressure measurement system used in cryogenics with suitable sketches? | Jun-23 | 14 |
| | Describe the working of McLeod Gauge with a neat sketch. | Aug-24 | 7 |
| 4 | Briefly mention the different non-storage type heat exchangers used in cryogenic equipment. | Dec-20 | 5 |
| 5 | Explain the different types of heat exchangers used in cryogenic liquefaction and refrigeration systems. | Aug-21 | 5 |
| 6 | With a neat sketch explain the types of heat exchangers used for cryogenic heat transfer | Sep-20 | 10 |
| 7 | Explain any one instrument for measuring vacuum pressure. | Aug-21 | 5 |
| 8 | Explain cryo-pumping and its application. | Dec-20 | 5 |
| | Explain the applications of a cryopump in detail. | Sep-20 | 4 |
| 9 | Explain different safety devices used in cryogenic liquid storage systems. | Sep-20 | 3 |

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| 10 | What are the most common hazards, that are encountered in a cryogenic environment? | Oct-23 | 3 |
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QUESTION BANK

MET402 MECHATRONICS

| Module 1 | | | |
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| No | Question | Mark | Year |
| 1 | Compare the working of resolver and synchro | 7 | May 2019 |
| 2 | Suggest two applications of Hall effect sensor in mechatronic systems | 7 | May 2019 |
| 3 | Differentiate between absolute and incremental encoders | 5 | May 2019 |
| 4 | Explain the working of an optical absolute encoder. How the number of tracks and sectors of absolute encoder is related to the resolution of the encoder? | 5 | May 2019 |
| 5 | Why cushioning is necessary for pneumatic actuators | 5 | May 2019 |
| 6 | Explain the working of incremental and absolute optical rotary encoders. Why gray code is used in coding absolute encoders | 6 | December 2019 |
| 7 | Explain the working of any one type each of flow and pressure sensors. | 6 | December 2019 |
| 8 | Define the following sensor characteristics (i) Time constant (ii) Hysteresis | 7 | September 2020 |
| 9 | Explain the principle of Hall effect. How a proximity sensor works on the basis of Hall effect? | 5 | September 2023 |
| 10 | Explain with schematic diagram the working of synchros. | 5 | December 2023 |
| 11 | Explain the working principle and applications of thermistor. | 6 | May-2024 |
| Module 2 | | | |
| No | Question | Mark | Year |
| 1 | Develop a pneumatic circuit with standard symbols, to operate two cylinders in sequence. Explain its working | 7 | December 2019 |
| 2 | Illustrate the working of spool valve and poppet valve with a neat sketch. | 5 | December 2019 |

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| 3 | With a neat sketch explain the working of diaphragm operated process control valve | 5 | September 2020 |
| 4 | A double acting cylinder is to be advanced either by operating a push button or by a foot pedal. Once the cylinder is fully advanced, it is to be retracted to its initial position. A 3/2-way roller lever valve is to be used to detect the full extension of the cylinder. Design a pneumatic circuit for this application. | 5 | September 2020 |
| 5 | Illustrate the working of spool valve and poppet valve with a neat sketch | 5 | August 2021 |
| 6 | A conveyor belt carries the finished product. A double acting cylinder is used for a transfer station to remove the products from the conveyor belt, when a push button is operated. At the point where the push button is released the double acting cylinder returns to its original position. Design a pneumatic system circuit for the given application | 5 | December 2021 |
| 7 | Discuss the use of diaphragm actuator in process control valves | 7 | June 2022 |
| 8 | Explain the principle, fabrication and working of MEMS based capacitive type pressure sensor. | 5 | December 2019 |
| 9 | Describe the DRIE process with a neat sketch. | 4 | December 2019 |
| 10 | Prepare a comparative report of each one technique in CVD and PVD. | 7 | December 2019 |
| 11 | Explain the procedure of photolithography using suitable figures | 6 | December 2021 |
| 12 | Explain Deep Reactive Ion Etching process using suitable figures | 7 | January 2023 |
| 13 | Explain LIGA process using suitable figures. Write down the advantages and disadvantages of LIGA process | 5 | January 2023 |
| 14 | Explain the configuration of a pneumatic actuation system with block diagram. | 6 | May-2024 |

Module 3

| No | Question | Mark | Year |
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| 1 | Comment on the stick-slip phenomenon associated with friction guide ways. | 5 | May 2019 |
| 2 | Explain the working of LM guide ways | 5 | May 2019 |

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| 3 | Compare the salient features of hydrostatic and hydrodynamic bearing. | 7 | December 2019 |
| 4 | Name the technique used to eliminate backlash in a ball screw. Illustrate the method of doing it. | 6 | December 2020 |
| 5 | What are the different shapes of Slideways that are commonly used? What are their advantages & Disadvantages? | 5 | June 2022 |
| 6 | Derive the mathematical model for a quarter car suspension system | 6 | September 2020 |
| 7 | Derive the mathematical model for the fluid system shown in the figure. | 5 | August 2021 |
| 8 | Write down the describing equations of Hydraulic system & Thermal system | 5 | December 2021 |
| 9 | Explain the working of a Re-circulating ball screws | 5 | January 2023 |
| 10 | What are the basic building blocks of an Electrical system? Obtain their describing equations. | 8 | May-2024 |
| Module 4 | | | |
| No | Question | Mark | Year |
| 1 | What is latching? Draw a simple latched circuit | 7 | September 2020 |
| 2 | Consider a pneumatic system with single-solenoid controlled valves and involving two cylinders A and B, with limit switches a-, a+, b-, b+ detecting the limits of the piston rod movements. Design a ladder programme with the requirement being when the start switch is triggered, the sequence A+, B+, A-, 10s time delay, B- occurs and stop at that point until the start switch is triggered again | 7 | September 2020 |
| 3 | Explain two methods used for input/output processing in PLC. | 6 | December 2020 |
| 4 | Compare the working of gain-scheduled control and self-tuning control in adaptive control systems. | 5 | December 2021 |
| 5 | Explain latching in PLC logic | 5 | December 2021 |
| 6 | Draw a block diagram of a feedback control system | 7 | May 2019 |
| 7 | With the help of a neat sketch explain the different mechatronics modules used in automatic car park barrier system | 5 | September 2020 |

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| 8 | With the help of a block diagram show different elements of car engine management system. Explain functions of important components. | 5 | December 2020 |
| 9 | Design PLC based pick and place robot. Draw the gripper movement and the arm control diagram | 5 | December 2021 |
| 10 | Develop a PLC ladder program for the following sequence: Provide lubricant for the gear box before the lathe spindle starts to run which aims to ensure that the oil pump motor starts first and the main motor starts subsequently | 10 | January 2023 |

Module 5

| No | Question | Mark | Year |
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| 1 | Draw the sketch of the basic configuration of a laser-based triangulation range finder | 5 | May 2019 |
| 2 | With a neat sketch, explain the physical system and working of a pick and place robot | 5 | May 2019 |
| 3 | List any four applications of robotic vision systems. | 7 | May 2019 |
| 4 | Draw sketches to discuss any two objectives of image segmentation. | 5 | May 2019 |
| 5 | With a flowchart, explain the steps in building of a smart system for automatic car park barrier system | 5 | May 2019 |
| 6 | List any two advantages of charge injection device camera for machine vision applications | 5 | May 2019 |
| 7 | With a sketch, discuss 'equalization' method in histogram processing. | 4 | May 2019 |
| 8 | Explain histogram processing technique for image processing. | 6 | December 2020 |
| 9 | What are the different types of stepper motor? Explain the working of any one type with a sketch. | 6 | August 2023 |
| 10 | Explain any one principle of measurement used by laser-based range finder | 5 | August 2023 |
| 11 | Explain the constructional features and working of brushless DC motor | 7 | May-2024 |

QUESTION BANK

COURSE: MET414 - Quality Management

| Module | Question | Month/Year | Marks |
|---|--|------------|-------|
| Module 1: Introduction to Quality Management | | | |
| 1 | Define and explain the characteristics of Total Quality Management (TQM). | May 2024 | 7 |
| 2 | Differentiate between quality assurance and quality control with examples. | Aug 2024 | 7 |
| 3 | Explain Deming's philosophy of quality management. | May 2024 | 14 |
| 4 | Describe the barriers to implementing a Total Quality Management program. | Aug 2024 | 7 |
| 5 | Compare Juran's and Crosby's approaches to quality management. | May 2023 | 14 |
| 6 | What are the dimensions of quality, and how do they influence product quality? | June 2023 | 7 |
| 7 | Explain the Three TQM Axioms. | Aug 2024 | 7 |
| 8 | Describe the concept of Juran's Trilogy and its significance in quality management. | May 2024 | 7 |
| 9 | Discuss the enablers and barriers to the implementation of TQM. | May 2023 | 14 |
| 10 | Write any two definitions of quality and explain their relevance in modern industries. | June 2023 | 3 |
| Module 2: Strategic Quality Management | | | |
| 1 | What are the steps in strategic quality planning? | May 2024 | 7 |
| 2 | Explain the significance of 5S in quality management and its implementation process. | June 2023 | 7 |
| 3 | Describe the concept of Quality Function Deployment (QFD). | May 2023 | 7 |
| 4 | What are the components of the cost of quality? | Aug 2024 | 7 |
| 5 | Explain Six Sigma quality and how it is achieved. | June 2023 | 7 |

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| 6 | What are the seven wastes under the lean manufacturing system? | May 2024 | 7 |
| 7 | Illustrate the steps to integrate quality into the strategic management of an organization. | Aug 2024 | 7 |
| 8 | Explain the procedure of the Kaizen approach and its importance. | June 2023 | 7 |
| 9 | Describe the concept of the "House of Quality" and its structure. | May 2023 | 7 |
| 10 | Enumerate the obstacles to achieving successful strategic quality management. | May 2023 | 7 |
| Module 3: Leadership and Teamwork in TQM | | | |
| 1 | Explain the importance of leadership in TQM and the qualities of an effective leader. | May 2024 | 7 |
| 2 | Define teamwork and describe its benefits and drawbacks in quality management. | June 2023 | 7 |
| 3 | Explain the concept of employee involvement and its role in TQM. | May 2023 | 7 |
| 4 | Discuss the significance of training in quality management. | Aug 2024 | 7 |
| 5 | What are self-managed teams? Discuss their benefits and problems. | May 2024 | 10 |
| 6 | Define motivation and explain its factors in the context of TQM. | May 2024 | 7 |
| 7 | Describe the role and responsibilities of a quality director in an organization. | June 2023 | 7 |
| 8 | What is change management? Explain the steps in the change management process. | Aug 2024 | 7 |
| 9 | Discuss how employee empowerment contributes to the success of TQM. | May 2023 | 7 |
| 10 | Explain the importance of top management's commitment to TQM initiatives. | June 2023 | 7 |
| Module 4: Tools and Techniques in Quality Management | | | |
| 1 | Describe the procedure to conduct Failure Mode and Effect Analysis (FMEA). | Aug 2024 | 7 |
| 2 | Explain Pareto analysis and its application in quality management. | June 2023 | 7 |

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| 3 | What are control charts? Describe their types and uses in quality control. | May 2023 | 7 |
| 4 | Illustrate the cause-and-effect diagram with an example. | Aug 2024 | 8 |
| 5 | Explain the principles of the Pareto diagram and its role in problem-solving. | May 2024 | 7 |
| 6 | Discuss the process of brainstorming and its advantages and disadvantages. | June 2023 | 7 |
| 7 | What are the eight pillars of Total Productive Maintenance (TPM)? | May 2023 | 7 |
| 8 | Describe the application of flow charts in identifying quality problems. | Aug 2024 | 7 |
| 9 | Explain the affinity diagram and its use as a management tool. | May 2023 | 7 |
| 10 | Enumerate the steps involved in implementing Total Productive Maintenance. | June 2023 | 7 |
| Module 5: Quality Standards and Certifications | | | |
| 1 | Describe the steps to implement and achieve ISO 9000 certification. | May 2024 | 14 |
| 2 | What are the responsibilities of top management in ISO 9001? | Aug 2024 | 7 |
| 3 | Define quality audits and explain their types. | May 2023 | 7 |
| 4 | What are the benefits of ISO certification? | June 2023 | 7 |
| 5 | Explain the structure and significance of ISO 14000 standards. | May 2024 | 7 |
| 6 | What are the benefits of quality audits in an organization? | Aug 2024 | 7 |
| 7 | Describe the procedure for internal auditing in ISO 9001. | May 2023 | 7 |
| 8 | Explain the requirements of the ISO 9001 quality system. | June 2023 | 7 |
| 9 | Discuss the step-by-step procedure for implementing a Quality Management System (QMS). | May 2024 | 14 |

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| 10 | What is Total Quality Maintenance, and how does it integrate with ISO standards? | May 2023 | 7 |
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MET 468 Additive Manufacturing

Question Bank

Module 1

| Sl. No | Question | Marks | Year |
|--------|---|-------|-------------|
| 1 | Write a note on Product development by AM | 3 | June 2023 |
| 2 | Classify and explain additive manufacturing process | 3 | May 2024 |
| 3 | Write a note on benefits of AM | 6 | August 2024 |
| 4 | Write a note on impact of AM on product development | 8 | Oct 2023 |
| 5 | Write a note on need and development of AM systems | 8 | June 2023 |
| 6 | Classify and Explain AM process | 6 | August 2024 |
| 7 | How additive manufacturing is different from subtractive manufacturing? | 3 | May 2024 |
| 8 | Explain the steps in AM process chain. | 6 | June 2023 |
| 9 | Write a note on the materials used in additive manufacturing. | 8 | August 2024 |
| 10 | Explain the steps involved in AM process? | 10 | Oct 2023 |
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Module 2

| Sl. No | Question | Marks | Year |
|--------|---|-------|-------------|
| 1 | Brief about support structure design | 3 | June 2023 |
| 2 | What are the advantages of part orientation | 3 | May 2024 |
| 3 | Explain about data formats and data interfacing | 6 | August 2024 |
| 4 | What is part orientation? Explain with illustration | 8 | Oct 2023 |
| 5 | Explain the need of support generation with flow charts | 8 | June 2023 |
| 6 | What are the steps involved in model slicing | 6 | August 2024 |

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| 7 | What are the limitations of tool path generation? | 6 | May 2024 |
| 8 | Explain model slicing and slicing methodologies? | 8 | June 2023 |
| 9 | What are the steps involved in model slicing | 6 | August 2024 |
| 10 | Brief about support structure design | 3 | Oct 2023 |
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Module 3

| Sl. No | Question | Marks | Year |
|--------|--|-------|-------------|
| 1 | Brief the LOM Process | 3 | June 2023 |
| 2 | What are the materials used in SLS | 3 | May 2024 |
| 3 | Brief about strength weakness and application of SLA | 6 | August 2024 |
| 4 | Explain the working principle and process variables of FDM | 8 | Oct 2023 |
| 5 | Brief about strength weakness and application of SLS | 6 | June 2023 |
| 6 | Explain the working principle and process variables of LOM | 8 | August 2024 |
| 7 | What are the applications of Selective Laser Sintering | 10 | May 2024 |
| 8 | Explain the working principle of Electron Beam Melting (EBM) with the help of a neat sketch. | 10 | June 2023 |
| 9 | Explain the working principle and process of Laser Engineering Net Shaping | 10 | August 2024 |
| 10 | What are the applications of Electron Beam Melting (EBM)? | 3 | Oct 2023 |

Module 4

| Sl. No | Question | Marks | Year |
|--------|--|-------|-----------|
| 1 | What are the strengths and weakness of 3DP | 3 | June 2023 |
| 2 | What are the merits of SLM | 3 | May 2024 |

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| 3 | Compare solid, liquid and powder based system of 3DP | 6 | August 2024 |
| 4 | Explain the working principle and process variables of 3DP | 8 | Oct 2023 |
| 5 | What is STL Format? Explain any 2 translators used in place of STL | 6 | June 2023 |
| 6 | Explain the working principle and process variables of LOM | 8 | August 2024 |
| 7 | What are the consequences of building an invalid STL model? | 10 | May 2024 |
| 8 | Explain various STL file problems? | 10 | June 2023 |
| 9 | What are the newly proposed data formats in AM. What are its merit over STL File format? | 8 | August 2024 |
| 10 | What are the merits of Selective Laser Melting? | 3 | Oct 2023 |

Module 5

| Sl. No | Question | Marks | Year |
|--------|---|-------|-------------|
| 1 | What are the fundamentals of rapid prototyping | 3 | June 2023 |
| 2 | List the types of industries that RP can be used in industrial applications | 3 | May 2024 |
| 3 | What are the benefits of using color in production of medical models | 6 | August 2024 |
| 4 | What AM materials are already approved for medical applications and for what types of applications are they suitable. | 8 | Oct 2023 |
| 5 | Discuss the steps followed in rapid prototyping process | 6 | June 2023 |
| 6 | What is rapid tooling and explain the applications of RPT in manufacturing and tooling. | 8 | August 2024 |
| 7 | Write a note on direct processes | | May 2024 |
| 8 | Explain direct tooling and indirect tooling with suitable examples. | | June 2023 |
| 9 | Explain the applications of additive manufacturing in aerospace sector | | August 2024 |
| 10 | Explain indirect prototyping and indirect manufacturing. | | Oct 2023 |