

MIZORAM PUBLIC SERVICE COMMISSION
DEPARTMENTAL EXAMINATION FOR JUNIOR GRADE OF M.E.S. (AE/SDO)
UNDER PUBLIC WORKS DEPARTMENT,
GOVERNMENT OF MIZORAM.
(JULY-2025)

ENGINEERING PAPER – II
(Common for Mechanical & Electrical Engineers)

Time Allowed : 3 hours

FM : 100 PM : 40

SECTION - A (Multiple Choice Questions) (50 Marks)

All questions carry equal mark of 1 each. Attempt all questions.

*This Section should be answered only on the **OMR Response Sheet** provided.*

1. Which of the following welding processes is primarily used for joining thin sheet metals, especially in the automotive industry?
(a) Shielded Metal Arc Welding (SMAW) (b) Gas Metal Arc Welding (GMAW)
(c) Gas Tungsten Arc Welding (GTAW) (d) Resistance Welding
2. Which of the following welding processes uses a consumable electrode wire that is also a shielding gas?
(a) Gas Metal Arc Welding (GMAW) (b) Gas Tungsten Arc Welding (GTAW)
(c) Shielded Metal Arc Welding (SMAW) (d) Flux-Cored Arc Welding (FCAW)
3. Which of the following welding processes is known for its ability to weld thick plates without filler metal?
(a) Resistance Welding (b) Gas Metal Arc Welding (GMAW)
(c) Submerged Arc Welding (SAW) (d) Shielded Metal Arc Welding (SMAW)
4. Which of the following is NOT a common method for measuring surface finish?
(a) Touch inspection (b) Optical inspection
(c) Scratch inspection (d) Weight inspection
5. What is the primary purpose of a shadow projector?
(a) To measure the temperature of an object
(b) To project images onto a screen for observation and measurement
(c) To measure the electrical conductivity of an object
(d) To create a 3D model of an object
6. Which of the following instruments is NOT used for linear measurement?
(a) Calipers (b) Micrometers
(c) Height gauge (d) Pressure gauge

7. What is the primary function of a gauge in metrology?
 - (a) To determine the physical properties of a material
 - (b) To measure the dimensions of a part and check if it meets design specifications
 - (c) To measure the temperature of an object
 - (d) To measure the speed of an object
8. Which of the following is NOT a type of measuring instrument?
 - (a) Digital caliper
 - (b) Vernier caliper
 - (c) Screw gauge
 - (d) Linear potentiometer
9. In which operation, motion of job is rotary and motion of cutting tool is forward translating?
 - (a) turning
 - (b) planning
 - (c) milling
 - (d) all of the mentioned
10. Which type of job motion is there in drilling operation?
 - (a) rotary
 - (b) translating
 - (c) fixed
 - (d) none of the mentioned
11. In which type of operation, motion of cutting tool is rotary as well as translating?
 - (a) planning
 - (b) milling
 - (c) drilling
 - (d) turning
12. Which of the following is the example of multi point cutting tool?
 - (a) milling cutter
 - (b) broaching tool
 - (c) both milling utter and broaching tool
 - (d) none of the mentioned
13. Which of the following is an example of non cutting shaping process?
 - (a) turning
 - (b) forging
 - (c) drilling
 - (d) milling
14. Which of the following is the example of cutting shaping process?
 - (a) knurling
 - (b) forging
 - (c) pressing
 - (d) drawing
15. In how many groups, various metal working processes can be classified?
 - (a) 2
 - (b) 3
 - (c) 4
 - (d) none of the mentioned
16. What is the primary function of a D G set?
 - (a) To produce electricity.
 - (b) To store electricity.
 - (c) To distribute electricity.
 - (d) To convert electrical energy to mechanical energy.
17. Which component of a D G set is responsible for converting mechanical energy into electrical energy?
 - (a) Diesel engine.
 - (b) Fuel tank.
 - (c) Alternator.
 - (d) Cooling system.

- 18.** What is the purpose of the cooling system in a D G set?
- (a) To generate electricity.
 - (b) To regulate voltage.
 - (c) To dissipate heat.
 - (d) To lubricate the engine.
- 19.** What is the purpose of regular maintenance of a D G set?
- (a) To extend its lifespan.
 - (b) To reduce fuel consumption.
 - (c) To increase its output voltage.
 - (d) To improve its aesthetics.
- 20.** Which of the following is a critical aspect of D G set maintenance?
- (a) Regular oil changes.
 - (b) Monitoring voltage.
 - (c) Checking battery levels.
 - (d) All of the above.
- 21.** What is a circuit diagram also known as?
- (a) A blueprint
 - (b) An elementary diagram
 - (c) A blueprint of a building
 - (d) A schematic diagram
- 22.** What is the purpose of a circuit diagram?
- (a) To represent the physical layout of a circuit
 - (b) To represent the electrical connections and components of a circuit
 - (c) To show the location of the components in a building
 - (d) To show the physical size of the components
- 23.** What is the primary purpose of an electrical installation?
- (a) To provide a source of energy for a building.
 - (b) To safely and reliably distribute electricity throughout a building.
 - (c) To create a visual aesthetic.
 - (d) To reduce electricity consumption.
- 24.** Which of the following is NOT a key consideration in the design of an electrical installation?
- (a) Meeting local electrical codes and regulations.
 - (b) Ensuring the safety of the installation.
 - (c) Minimizing costs.
 - (d) Designing for aesthetic appeal.
- 25.** What is the purpose of a circuit breaker?
- (a) To convert electrical energy into other forms.
 - (b) To provide a temporary solution for low voltage.
 - (c) To protect the electrical system from overloads and short circuits.
 - (d) To reduce the voltage of the incoming electricity.
- 26.** Which of the following is a key step in the procedure for condemning old and unserviceable machinery and equipment?
- (a) Ignoring the equipment and allowing it to continue operating until it completely fails.
 - (b) Conducting a detailed inspection and assessment by a qualified engineer to determine if the equipment is beyond economical repair.
 - (c) Immediately discarding the equipment without any further action.
 - (d) Ignoring the equipment and allowing it to continue operating until it completely fails.

27. The condemning of old and unserviceable Machinery & equipment must be of the following
- (a) The Machineries must be over the life span fixed by condemnation board of Mizoram Govt.
 - (b) The Machineries must be off-road
 - (c) The Machineries must be beyond economical repair
 - (d) All of the above
28. What is Refrigeration?
- (a) Refrigeration is the process of removing heat from a substance and cooling it to a temperature or below the actual temperature
 - (b) Refrigeration is the process of adding heat from a substance and cooling it to a Temperature
 - (c) Refrigeration is used to increase the level of humidity in the air by adding heat
 - (d) None of the mentioned
29. Which of the following refers to the term C.O.P. of refrigeration?
- (a) Cooling for Performance
 - (b) Coefficient of Performance
 - (c) Capacity of Performance
 - (d) Co-efficient of Plant
30. Which of the following is the main disadvantage of natural refrigeration methods?
- (a) natural refrigeration methods are dependent on local conditions
 - (b) natural refrigeration methods are not environment friendly
 - (c) natural refrigeration methods are expensive
 - (d) natural refrigeration methods are poisonous
31. Which of the following of the refrigerant is used as a refrigerant in Lithium Bromide Absorption Refrigeration system?
- (a) Lithium Bromide
 - (b) Hydrogen
 - (c) Water
 - (d) Ammonia
32. Which of the following is the common application of Air standard refrigeration system?
- (a) Cold storage
 - (b) Car air conditioning system
 - (c) Domestic refrigerators
 - (d) Aircraft air conditioning
33. What is Air Conditioning?
- (a) Air Conditioning is the process of adding heat and increasing the humidity
 - (b) Air Conditioning is the process of removing heat and controlling the humidity of air in a closed space
 - (c) Air conditioning is the process of controlling air moisture in an open area by adding heat
 - (d) None of the mentioned
34. Which of the following process is used in winter air conditioning?
- (a) Cooling and Dehumidification
 - (b) Heating and Humidification
 - (c) Dehumidification
 - (d) Humidification
35. On which of the following cycle the air conditioning systems are based in transport aviation?
- (a) Reversed Joule's cycle
 - (b) Otto cycle
 - (c) Reversed Carnot cycle
 - (d) Reversed Brayton cycle

- 36.** Which of the following process is used in summer air conditioning?
- (a) Heating and Humidification
 - (b) Cooling and Dehumidification
 - (c) Humidification
 - (d) Dehumidification
- 37.** Which of the following uses natural convection air-cooled condensers?
- (a) High capacity room air conditioners
 - (b) Industrial air conditioners
 - (c) Domestic refrigerators
 - (d) High capacity water coolers
- 38.** H.R.C. fuse, as compared to a rewirable fuse, has
- (a) no ageing effect
 - (b) high speed of operation
 - (c) high rupturing capacity
 - (d) all of the above
- 39.** A short circuit is identified by
- (a) no current flow
 - (b) heavy current flow
 - (c) voltage drop
 - (d) voltage rise
- 40.** The advantage of neutral earthing is
- (a) Freedom from persistent arcing grounds
 - (b) Over voltages due to lightning can be discharged to earth
 - (c) Simplified design earth fault protection
 - (d) All of the above
- 41.** Which of the following devices detects and interrupts ground faults?
- (a) Fuse
 - (b) ELCB
 - (c) MCB
 - (d) Isolator
- 42.** Purpose of backup protection is
- (a) to increase the speed.
 - (b) to increase a reach.
 - (c) to leave no blind spot.
 - (d) to guard against failure of primary.
- 43.** Load torques can be classified into how many types?
- (a) Three
 - (b) Two
 - (c) Four
 - (d) Five
- 44.** When designing an electrical installation, which of the following is NOT a key consideration?
- (a) Safety standards and regulations
 - (b) Aesthetics of the wiring
 - (c) Cost-effectiveness of materials
 - (d) Future expansion and upgrades
- 45.** What is the purpose of a “depreciation factor” in illumination calculations?
- (a) To calculate the luminous flux of a lamp
 - (b) To account for the loss of light output over time
 - (c) To calculate the illumination level at a specific point
 - (d) To determine the color temperature of a light source
- 46.** Which of the following lighting schemes is most likely to provide a warm and inviting atmosphere in a restaurant?
- (a) Direct lighting
 - (b) High-intensity spot lighting
 - (c) Indirect lighting with warm color temperatures
 - (d) Fluorescent lighting

- 47.** What is the purpose of using a diffuser in a lighting fixture?
- (a) To increase the luminous flux
 - (b) To improve the color rendering index (CRI)
 - (c) To reduce glare and reflections
 - (d) To increase the energy efficiency of the fixture
- 48.** A building designer is choosing lighting fixtures for a classroom. Which of the following factors should be considered when designing the lighting scheme?
- (a) The color temperature of the light source
 - (b) The number of students in the classroom
 - (c) The desired illumination level for the working plane
 - (d) The age and eyesight of the students
- 49.** Which of the following lighting schemes is least suitable for a high-traffic public space, like a shopping mall?
- (a) Direct lighting
 - (b) Semi-direct lighting
 - (c) Indirect lighting
 - (d) A combination of direct and indirect lighting
- 50.** A lighting scheme uses a high CRI light source. What does this mean?
- (a) The light source has a high luminous output
 - (b) The light source is more energy-efficient
 - (c) The light source accurately reproduces colors
 - (d) The light source is less expensive

SECTION- B (Conventional Type) (50 Marks)

*This Section should be answered only on the **Answer Sheet** provided.
All questions carry equal 5 (five) marks each.*

Directions (Question Nos. 1 - 7) Answer any 5 (five) question of the following:

1. What are the different types of welding, and what is the best welding for finishing works? Why?
2. What is the most high precision measuring system? Mention its uses?
3. What are the components of D.G set with each functions?
4. What are the main data for making drawing of Electrical system in the Domestic Internal electrifications?
5. What is free Maintenance Earthing and advantages over conventional Earthing ?
6. What is ESE Lightning arrestor and advantages over conventional Lightning arrestor ?
7. What are the important tests to be carried out in Internal Electrification works and how is it to be done?

Directions (Question Nos. 8 - 15) Answer any 5 (five) question of the following:

8. What are the procedure to be followed at the time of condemnation of Old and Unserviceable Machineries and equipment?
9. Define Refrigeration Process in Modern Inverter frost free Refrigerator and advantages over Reciprocal compressor Refrigerator.
10. Define different types of earth mover, what is the best option for formation cutting machines nowadays and how and why ?
11. What are the different types of service connections that can be obtained from Mizoram Power & Electricity Department? How much supplier Earth ohm value to be achieved and Consumer Earth ohm value to be obtained for good service connection?
12. How many types of Internal Electrical wiring are approved by MPWD? Suggest the type of wiring to be used in Modern Building (RCC Building).
13. Define co-efficient of utilization, and list out anything that effect the values of co-efficient Of Utilization.
14. Define Depreciation factor, and list out anything that effect the values of co-efficient of Utilization.
15. What is illumination ? How to calculate the level of illumination in a given room/ Buildings as Lux/ sqm?

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