

**MIZORAM PUBLIC SERVICE COMMISSION**  
**DEPARTMENTAL EXAMINATIONS FOR JUNIOR GRADE OF M.E.S. (AE/SDO)**  
**UNDER PUBLIC WORKS DEPARTMENT,**  
**GOVERNMENT OF MIZORAM, JULY, 2022.**

**MECHANICAL ENGINEERING PAPER – I**

Time Allowed : 3 hours

FM : 100 PM : 40

*Marks for each question is indicated against it.*  
*Attempt all questions.*

1. Choose the correct answers:

**(10×1=10)**

- (a) In a 4-stroke cycle engine, the sequence of operation is  
(i) Suction, compression, expansion & exhaust  
(ii) Suction, expansion, compression & exhaust  
(iii) Expansion, compression, suction & exhaust  
(iv) Compression, expansion, suction & exhaust
- (b) A carburettor is used to supply  
(i) Air & lubricating oil  
(ii) Air & Diesel  
(iii) Petrol & lubricating oil  
(iv) Petrol & Air
- (c) The operation of forcing additional air under pressure in the cylinder is known as  
(i) Scavenging  
(ii) Supercharging  
(iii) Pre-ignition  
(iv) Turbulance
- (d) An air-craft engine use for cooling engine is  
(i) A force cooling system  
(ii) A water cooled system  
(iii) A thermo-syphon cooling system  
(iv) An air-cooled system
- (e) Which material is used as Secondary filter element in the diesel fuel system  
(i) Strainer  
(ii) Cloth  
(iii) Paper  
(iv) Wire Mesh
- (f) Which part is firstly rotated by self-starter while starting a diesel engine  
(i) rankshaft  
(ii) Flywheel  
(iii) Camshaft  
(iv) Vibration Damper
- (g) The electrolyte used in lead battery is  
(i) Nitric acid  
(ii) Citric acid  
(iii) Hydrochloric acid  
(iv) Sulphuric acid
- (h) The engine valves mechanism is operated by  
(i) Crankshaft  
(ii) Timing gear  
(iii) Flywheel  
(iv) Camshaft
- (i) The brushes of a dynamo are made of  
(i) Copper  
(ii) Aluminium  
(iii) Brass  
(iv) Carbon
- (j) Which of the following is the standard format for recording defects in a vehicle at a service station?  
(i) Job Card  
(ii) Log Book  
(iii) Car Diary  
(iv) Maintenance Manual

2. True or False : (10×1=10)
- (a) The field coils of D.C. generator are usually made of carbon.
  - (b) A D.C. generator works on the principle of Faraday's law of electromagnetic induction.
  - (c) A machine that converts mechanical energy into electrical energy is A. C .generator.
  - (d) Current in a circuit is wattles if the resistance in a circuit is zero.
  - (e) An electric motor converts electrical energy into mechanical energy.
  - (f) Welding generator will have Delta winding.
  - (g) The rotating part of D. C. motor is known as stator.
  - (h) A wet mix plant can also be used with slight modification and other optional devices for blending of materials for Granular Sub-Base(GSB).
  - (i) A dozer can economically push materials up to a distance of 300 meters.
  - (j) A motor grader is a self-propelled wheeled machine having non-adjustable blade, positioned between front and rear axles.
3. What are the differences between AC and DC motors? Give examples. (5)
4. What is the major difference between single phase and three phase transformers? Draw the diagrams. (5)
5. A machine cost Rs.8,00,000 having recommended life of 10 years, with a salvage value of Rs.50,000. What is its book value after 8 years, using a straight line method? (5)
6. What are the different components of hire charges of machinery? Explain. (10)
7. What are the different types of workshop mentioned in the Handbook on Road Construction Machinery published by IRC? State their respective locations. (10)
8. What is the Corona Discharge? What are the main factors affecting Corona Discharge? (10)
9. What are the advantages of XLPE Cables compared to PVC Cables? (10)
10. Fill in the Blanks: (10×1=10)
- (a) The market situation where there is only one buyer and one seller is called \_\_\_\_\_ .
  - (b) The appropriate costing method for a manufacturer producing very few but very expensive items is called \_\_\_\_\_ .
  - (c) The price reductions offered to customers for large orders to encourage them to purchase in large quantities is known as \_\_\_\_\_ .
  - (d) Minimum stock level below which actual stock should not fall is known as \_\_\_\_\_ .
  - (e) Bin card is also known as \_\_\_\_\_ .
  - (f) The component which connects the sub-station to the area where power is to be distributed is called \_\_\_\_\_ .
  - (g) The cable which connect the distributor to the consumer terminal is \_\_\_\_\_ .
  - (h) The \_\_\_\_\_ protects a cable against mechanical injury.
  - (i) A standard conductor cable is expressed as 3/0.029. The diameter of each strand is \_\_\_\_\_ mm.
  - (j) The cross-sectional area of a simple strand wire is expressed as 300 sq.mm. The diameter of the wire is \_\_\_\_\_ mm.
11. What are the advantages and disadvantages of underground cable system? (10)
12. What is a bus bar? Explain. (5)