

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

ENGINEERING PAPER – I

(Common for Civil, Electrical and Mechanical 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. As per the IS 10500, the Indian Standard Code of practice for Drinking water the Acceptable Limit of pH value for Drinking Water is-
(a) 7.5 - 8.5 (b) 6.0 - 8.0
(c) 7.0 - 8.0 (d) 6.5 - 8.5
2. Biochemical Oxygen Demand(BOD) of safe drinking water must be-
(a) > 20 (b) < 5
(c) < 10 (d) 0
3. What is the name of the thin biological film formed at the top of the sand layer in a slow sand filter?
(a) Slime (b) Algae
(c) Schmutzdecke (d) Sponge
4. Which of these is an artificial recharge practice for ground water?
(a) Contour bund/Trench (b) Nala bund/Check dam/percolation tank
(c) Injection well/recharge shaft (d) All of them
5. Surge tanks in a water conveyance system are used-
(a) as water storage (b) to increase the pressure
(c) as overflow pipes (d) to guard against water hammer
6. Centrifugal pumps are always started with its delivery valve-
(a) kept partially open (b) kept fully open
(c) irrespective of any position (d) kept fully closed
7. Which of this is not a biodegradable form of solid waste?
(a) plastic (b) kitchen waste
(c) paper and cardboard (d) wooden furniture
8. The relatively clean wastewater from baths, sinks, washing machines and other kitchen appliances is called-
(a) black water (b) grey water
(c) waste water (d) yellow water

9. One horsepower is equal to-
 - (a) 550 watts
 - (b) 75 watts
 - (c) 735 watts
 - (d) 102 watts
10. Phase loss in a 3 phase induction motor will not cause-
 - (a) reduced speed
 - (b) increased current
 - (c) overheating
 - (d) increased efficiency
11. The boundary between the saturated zone and unsaturated zone is called the-
 - (a) aquifer
 - (b) water table
 - (c) aquiclude
 - (d) permeability
12. The year of notification of the Mizoram Water Supply (Control) Act and the most current Mizoram Water Supply (Control) Rules currently in force under the Principal Act is-
 - (a) 2004 & 2016
 - (b) 2006 & 2016
 - (c) 2004 & 2023
 - (d) 2004 & 2025
13. The most commonly used coagulant is-
 - (a) Sodium Hypochloride
 - (b) Lime
 - (c) Bleaching powder
 - (d) Alum
14. The suggested type of cement for use in Sewage Treatment plant is-
 - (a) Rapid Hardening Cement
 - (b) Quick Setting Cement
 - (c) Sulphate Resistant Cement
 - (d) Low Heat Cement
15. Under Rule 7 of the current Mizoram Water Supply (Control) Rules, the rates of water and other charges may be revised by the Department by issue of notification not more than-
 - (a) once in a year
 - (b) half yearly
 - (c) twice in a year
 - (d) three times a year
16. The quorum for a General Body Meeting of MESA will be-
 - (a) 1/8th
 - (b) 1/6th
 - (c) 1/4th
 - (d) 1/3rd
17. Which of these is not a standard diameter of a commercial GI Pipe?
 - (a) 32
 - (b) 80
 - (c) 50
 - (d) 120
18. As per the IS Code of practice for Plain and Reinforced Concrete, the minimum cover to reinforcement in a RCC Column is-
 - (a) 20mm
 - (b) 30mm
 - (c) 40mm
 - (d) 50mm
19. Population forecast of a rapidly growing city may be estimated by-
 - (a) Arithmetic Increase Method
 - (b) Incremental Increase Method
 - (c) Geometrical Increase Method
 - (d) Graphical Method
20. The maximum pressure which a pipeline can withstand without any leakage during a Hydrostatic Pressure Test is called-
 - (a) Working Pressure
 - (b) Hydrostatic Pressure
 - (c) Design Pressure
 - (d) Test Pressure

- 21.** In which year did the Jal Shakti Ministry launch the Jal Jeevan Mission?
- (a) 2018 (b) 2021
(c) 2019 (d) 2023
- 22.** When raw water is treated with only chlorine, it is called-
- (a) Pre chlorination (b) Post Chlorination
(c) Plain Chlorination (d) First Chlorination
- 23.** Which of these is not a water borne disease?
- (a) Cholera (b) Malaria
(c) Typhoid (d) Botulism
- 24.** The point at which the centrifugal pump operates at maximum efficiency is-
- (a) Flow point (b) Operating point
(c) Static point (d) Duty point
- 25.** A sedimentation tank in a WTP under normal operating conditions, can remove suspended particles upto-
- (a) 30% (b) 50%
(c) 90% (d) 70%
- 26.** In a gravity main pipeline, air valves are provided at the-
- (a) junction points (b) summit points
(c) lower points (d) starting point
- 27.** The most commonly used high head pumps for water supply in Mizoram is-
- (a) centrifugal pump (b) submersible pump
(c) multistage centrifugal pump (d) reciprocating pump
- 28.** The efficiency of an AC Induction Motor at Maximum power is-
- (a) 75% - 90 % (b) 65%
(c) 70% - 80 % (d) < 60 %
- 29.** The area surrounding the body of water from where the flow of water originates is the-
- (a) Impounding Reservoir (b) Source
(c) Water cycle (d) Watershed
- 30.** The yield of a ground water source can be determined by-
- (a) Ground water recharge Test (b) Hand pump tube well
(c) Submersible pump Test (d) Recuperative Test
- 31.** Activated carbon is used in water treatment for removing-
- (a) colour (b) taste and odour
(c) turbidity (d) chemicals
- 32.** On the delivery side of each pump in a parallel multiple pump setup, a NRV is fitted-
- (a) between reflux valve and pump (b) before surge tank
(c) After the gate valve (d) between pump and gate valve
- 33.** In a multistage centrifugal pump, at each stage the fluid is directed-
- (a) Towards the centre (b) Towards the impeller
(c) Towards the surface casing (d) Away from the centre

34. In a gravity main pipeline, drain valves/scour valves are provided at the-
- (a) lower points
 - (b) junction points
 - (c) higher points
 - (d) end point
35. The most common type of water meter installed in residential areas for Municipal Water Supply is-
- (a) A velocity meter
 - (b) A displacement meter
 - (c) An inferential meter
 - (d) An electronic meter
36. The preferable type of cement for mass concreting works likes Dams and retaining walls is-
- (a) Ordinary Portland Cement
 - (b) Portland Pozzolona Cement
 - (c) Rapid Hardening Cement
 - (d) Sulphate Resistant Cement
37. As per the current Mizoram Water Supply (Control) Rules in force, the authority for approving pipe size above 20mm dia rests with the-
- (a) Executive Engineer
 - (b) Superintending Engineer
 - (c) Both Executive Engineer and Sub Divisional Officer
 - (d) Both Superintending Engineer and Executive Engineer
38. The impervious lining in a Sanitary Landfill is for the purpose of-
- (a) Preventing ground water pollution
 - (b) Collecting leachates for treatment
 - (c) Mitigating environmental risk of landfill
 - (d) All of the above
39. The type of joints which is generally adopted in a water pumping station is-
- (a) Flexible joint
 - (b) Flanged joint
 - (c) Expansion joint
 - (d) Socket and spigot joint
40. Which of the following gas plays a critical role in Climate Change?
- (a) Oxygen
 - (b) Nitrogen
 - (c) Carbon Dioxide
 - (d) Hydrogen
41. A household septic tank functions mainly due to-
- (a) Aerobic decomposition
 - (b) Organic composting
 - (c) Both aerobic and anaerobic decoposition
 - (d) Anaerobic decomposition
42. Blue Baby Syndrome is caused in infants due to the presence in drinking water of higher concentration of-
- (a) Arsenic
 - (b) Nitrites
 - (c) Nitrates
 - (d) Lead
43. A centrifugal pump should not be operated when-
- (a) Water enters the pump casing
 - (b) NPSHA is less than NPSHR
 - (c) Dynamic head is high
 - (d) friction loss is high
44. The storage capacity in a Dam reservoir is mainly divided into 3 zones. The lowest zone is-
- (a) dead storage
 - (b) sludge zone
 - (c) surcharge storage
 - (d) useful storage
45. India Mark-II & India Mark-III Handpumps can be easily differentiated from the-
- (a) casing pipe
 - (b) pump head
 - (c) riser pipe
 - (d) water tank

- 46.** The process by which cement is injected under pressure to fill fracture gaps in formation is-
- (a) plastering
 - (b) caulking
 - (c) guniting
 - (d) grouting
- 47.** The rate of filtration that can be achieved in a Slow Sand Filter lies in the range of
- (a) 1000-2000 litres/Sqm/hr
 - (b) 100-200 litres/Sqm/hr
 - (c) 3000-6000 litres/Sqm/hr
 - (d) 400-800 litres/Sqm/hr
- 48.** A good way to rejuvenate a depleted spring source and make it sustainable in the long term is-
- (a) Regenerate and conserve the forest in the catchment area
 - (b) Built check dams and gully plugs to slow down the flow of water
 - (c) Built contour trench and catch pits to facilitate infiltration
 - (d) All of the above
- 49.** The process of passing water through beds of granular materials is called-
- (a) sedimentation
 - (b) filtration
 - (c) screening
 - (d) aeration
- 50.** In a centrifugal pump, the liquid enters the pump-
- (a) at the top
 - (b) at the centre
 - (c) at the bottom
 - (d) at the sides

SECTION - B (50 Marks)

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

Direction (Questions No. 1-6) : Short Answers - Attempt any 5 (five) Question

(5×4=20)

1. What are the common methods adopted for the extraction of raw water from a river /stream for a water supply project.
2. What do you mean by Water Hammer? What are the remedial measures that can be adopted to reduce/prevent Water Hammer?
3. What are the different types of Aquifers? Briefly describe the reliability of each for water supply in a mountainous region.
4. What do these abbreviations stand for? Any 4 (four) may be attempted.

(a) AMRUT	(b) SASCI
(c) CPHEEO	(d) NEERI
(e) JICA	(f) HGJ
5. What are the most common methods adopted for the disinfection of Municipal drinking water supply?
6. Write the permissible limit of any 4(four) of the following parameters as per IS 10500-2012.

(a) Turbidity	(b) Total dissolved solids
(c) Total hardness	(d) Total alkalinity
(e) Iron	

Direction (Questions No.7 - 10) : Long Answers - Attempt any 3 (Three) Questions

(3×10=30)

7. Design a Rapid Sand Filter for delivering 5 MLD drinking water. Reasonable assumptions may be adopted.
8. Enumerate the different technology options for water harvesting.
9. What are the most common types of pipes used for the conveyance of water? Briefly enumerate the advantages as well as the disadvantages of each pipe material.
10. Briefly describe the main components of a 33 KV Power Sub Station with a sketch.

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