

MIZORAM PUBLIC SERVICE COMMISSION
DEPARTMENTAL EXAMINATION FOR JUNIOR ENGINEER
UNDER PUBLIC HEALTH ENGINEERING DEPARTMENT,
GOVERNMENT OF MIZORAM.
(JULY-2025)

ENGINEERING PAPER
(CIVIL ENGINEERING)

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 materials is commonly used in hand pump tube wells?
 - (a) PVC
 - (b) GI
 - (c) RCC
 - (d) Copper
2. The main purpose of a soak pit in rural sanitation is to:
 - (a) Allow percolation of wastewater
 - (b) Store drinking water
 - (c) Trap solid waste
 - (d) Collect rainwater
3. Which one of the following is a reinforced material?
 - (a) Plain Cement Concrete
 - (b) Brick
 - (c) Reinforced Cement Concrete
 - (d) Stone
4. HDPE pipes are mostly preferred for:
 - (a) Electrical wiring
 - (b) Portable water supply due to flexibility
 - (c) Sewer lines only
 - (d) Road construction
5. The Mizoram Water Supply (Control) Act mainly regulates:
 - (a) Use and supply of drinking water
 - (b) Construction of dams
 - (c) Water quality testing
 - (d) River water disputes
6. Which one of the following is an advantage of GI pipes?
 - (a) High tensile strength
 - (b) Prone to rust
 - (c) Heavy maintenance
 - (d) Cannot withstand pressure

7. Assam-type buildings are primarily made of:
- (a) Stone and RCC
 - (b) Timber and corrugated roofing
 - (c) GI sheets
 - (d) Glass and steel
8. Which one of these is not a component of rural sanitation?
- (a) Soak pit
 - (b) Night soil disposal
 - (c) Septic tank
 - (d) Storm water drain
9. The term “characterization” in solid waste management refers to:
- (a) Identifying components and types of waste
 - (b) Incinerating solid waste
 - (c) Burying waste
 - (d) Burning waste
10. Rainwater harvesting does not include:
- (a) Roof catchment
 - (b) Ground recharge pit
 - (c) Desalination plant
 - (d) Storage tank
11. Which type of intake is commonly used in rivers?
- (a) Wet intake
 - (b) Direct pumping intake
 - (c) Ground intake
 - (d) Infiltration intake
12. A septic tank system is mainly used in:
- (a) Rural and semi-urban areas
 - (b) Industrial treatment plants
 - (c) Desalination
 - (d) Water distribution
13. What is the unit of measurement for earthwork volume?
- (a) Square meters
 - (b) Liters
 - (c) Cubic meters
 - (d) Tons
14. The pipe appurtenance that releases trapped air in pipelines is:
- (a) Check valve
 - (b) Non-return valve
 - (c) Sluice valve
 - (d) Air valve
15. RCC stands for:
- (a) Rolled Cement Concrete
 - (b) Reinforced Cement Concrete
 - (c) Ready Cement Concrete
 - (d) Rapid Cast Cement
16. Which of the following pipe materials is corrosion-resistant?
- (a) DI
 - (b) CI
 - (c) HDPE
 - (d) ERW
17. The most economical channel section for open flow is:
- (a) Semi-circular
 - (b) Circular
 - (c) Rectangular
 - (d) Trapezoidal
18. The process of separating biodegradable and non-biodegradable waste is called:
- (a) Disposal
 - (b) Segregation
 - (c) Collection
 - (d) Treatment

- 19.** Which of the following is not a type of masonry work?
- (a) Brick
 - (b) Stone
 - (c) RCC
 - (d) Laterite
- 20.** What is the main purpose of trenching in rural sanitation?
- (a) Laying pipelines
 - (b) Disposal of night soil
 - (c) Foundation laying
 - (d) Water harvesting
- 21.** Which structure is built for retaining soil?
- (a) Septic tank
 - (b) Soak pit
 - (c) Infiltration gallery
 - (d) Retaining wall
- 22.** What is the major advantage of ERW pipes?
- (a) High flexibility
 - (b) Corrosion resistance
 - (c) Smooth surface and economical
 - (d) Fire resistance
- 23.** Night soil collection refers to:
- (a) Manual collection of human waste
 - (b) Storage of rainwater
 - (c) Collection of grey water
 - (d) Water sample testing
- 24.** The slope of an open channel affects:
- (a) Width of pipe
 - (b) Flow velocity
 - (c) Temperature
 - (d) Odour level
- 25.** The key reason for conducting a water supply survey is to:
- (a) Increase groundwater level
 - (b) Assess rainfall patterns
 - (c) Improve road network
 - (d) Plan intake and reservoir location
- 26.** Which brick is considered the best quality?
- (a) Second-class brick
 - (b) Overburnt brick
 - (c) First-class brick
 - (d) Sun-dried brick
- 27.** Isolated footing is used to support:
- (a) A group of columns
 - (b) A wall
 - (c) A single column
 - (d) A retaining wall
- 28.** Coagulation in water treatment helps in:
- (a) Removing color
 - (b) Killing bacteria
 - (c) Settling suspended particles
 - (d) Reducing hardness
- 29.** Disinfection of water is mainly done to:
- (a) Remove suspended solids
 - (b) Improve color
 - (c) Kill pathogens
 - (d) Remove dissolved salts
- 30.** Turbidity in water is measured in:
- (a) mg/L
 - (b) ppm
 - (c) NTU
 - (d) pH units

- 31.** In water supply engineering, excess iron in drinking water can cause:
- (a) Hardness
 - (b) Taste and staining issues
 - (c) Increased pH
 - (d) Foam formation
- 32.** Which among the following is not a method of population forecasting in civil engineering?
- (a) Arithmetical increase
 - (b) Geometric increase
 - (c) Logistic curve
 - (d) Standard Proctor
- 33.** Which is a merit of the arithmetical increase method?
- (a) It considers population saturation limits
 - (b) It is simple and easy to apply
 - (c) It accounts for migration accurately
 - (d) It predicts exponential growth well
- 34.** Water used for firefighting is considered:
- (a) Domestic demand
 - (b) Institutional demand
 - (c) Public demand
 - (d) Agricultural demand
- 35.** Per capita demand depends on:
- (a) Climate and living standards
 - (b) Soil type
 - (c) Roof slope
 - (d) Street width
- 36.** The minimum grade of concrete for RCC work is:
- (a) M10
 - (b) M15
 - (c) M20
 - (d) M25
- 37.** The slump test is performed to check:
- (a) Strength
 - (b) Setting time
 - (c) Workability
 - (d) Water-cement ratio
- 38.** Curing should be done for at least:
- (a) 3 days
 - (b) 5 days
 - (c) 7 days
 - (d) 28 days
- 39.** As per IS 3370, the minimum concrete grade for water-retaining structures is:
- (a) M20
 - (b) M25
 - (c) M30
 - (d) M35
- 40.** Leakage in water tanks is mostly due to:
- (a) Air pressure
 - (b) Improper curing
 - (c) Strong concrete
 - (d) Too much water
- 41.** For water-retaining structures, the maximum water-cement ratio is:
- (a) 0.65
 - (b) 0.55
 - (c) 0.50
 - (d) 0.45
- 42.** The minimum thickness of an RCC base slab in a water tank should generally be:
- (a) 100 mm
 - (b) 150 mm
 - (c) 200 mm
 - (d) 250 mm

- 43.** What is the main purpose of providing cover to reinforcement in concrete structures?
- (a) Improve the appearance of concrete
 - (b) Reduce the cost of reinforcement
 - (c) Protect steel from corrosion and fire
 - (d) Make concrete lighter
- 44.** Materials used for lightning protection include:
- (a) Glass
 - (b) Rubber
 - (c) Copper or aluminum
 - (d) PVC
- 45.** The standard duration for water tightness test is:
- (a) 6 hours
 - (b) 12 hours
 - (c) 24 to 72 hours
 - (d) 7 days
- 46.** A combined drainage system carries:
- (a) Only sewage
 - (b) Only storm water
 - (c) Both sewage and storm water
 - (d) Treated effluent
- 47.** What is the primary purpose of rainwater harvesting?
- (a) Increase humidity
 - (b) Recharge groundwater and reduce water shortage
 - (c) Prevent soil erosion
 - (d) Cool the environment
- 48.** Waterborne diseases include:
- (a) Tuberculosis
 - (b) Malaria
 - (c) Cholera
 - (d) Cancer
- 49.** The most effective method to control water-borne diseases is:
- (a) Handwashing
 - (b) Proper chlorination and water treatment
 - (c) Wearing masks
 - (d) Vaccination
- 50.** Refuse includes:
- (a) Only liquid waste
 - (b) Only plastic waste
 - (c) All types of solid waste
 - (d) Industrial waste only

Section - B (25 Marks)

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

Marks for each question is indicated against it.

1. Explain the different types of pipes used in water conveyance along with their advantages and disadvantages. (5)
2. Describe the process of survey and site selection for a water supply reservoir. What are the important factors to be considered? (5)
3. What are the types of Hand Pump Tube Wells (HPTW)? Explain their importance in rural water supply. (5)
4. Write short notes on the following: (5×1=5)
 - (a) Two-pit latrines
 - (b) Septic tanks
 - (c) Soak pits
 - (d) Trenching and composting methods
 - (e) Public latrines

OR

Explain the differences between RCC buildings and Assam-type buildings. Mention their suitability and advantages in different geographical areas. (5)

5. Define solid waste management and explain its characterization and segregation processes. (5)

OR

Discuss the design and advantages of trapezoidal and rectangular sections in open channel flow. Which one is considered more economical and why?

Section - C (25 Marks)

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

Marks for each question is indicated against it.

Attempt all questions.

6. What is the basic raw material for cement? (1)
7. What is the standard size of modular brick? (1)
8. What is the maximum time to place concrete after mixing? (1)
9. Name the test apparatus used for setting time of cement. (1)
10. What is the full form of BOD in water treatment? (1)
11. What is M20 concrete mix ratio? (1)
12. What does slump test determines? (1)
13. What is the minimum size of an RCC column? (1)
14. What is a simply supported beam? (1)
15. What is the term for chemical reaction between cement and water? (1)
16. Minimum wall thickness of RCC tank is? (1)
17. Which code provides guidelines for reinforcement spacing in India? (1)
18. The bending moment at the ends of a simply supported beam is always? (1)
19. The unit 'LPCD' stands for: (1)
20. Which bacteria is commonly used as an indicator of fecal contamination in water? (1)
21. What is the difference between coarse and fine aggregates? (2)
22. Water demand for a city with population 1 lakh and per capita consumption 135 LPCD is? (2)
23. Volume of cement for 14 m³ concrete (1:2:4) is? (2)
24. Capacity of sedimentation tank, inflow 2,000 L/hr, detention time 3 hrs is? (2)
25. Calculate the development length (L_d) required for a 16 Φ Fe415 bar in M25 grade concrete under tension. Take $\sigma_s = 440 \text{ N/mm}^2$ and $\tau_{bd} = 4 \text{ N/mm}^2$. (2)

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