

MIZORAM PUBLIC SERVICE COMMISSION

DEPARTMENTAL EXAMINATIONS FOR JUNIOR GRADE OF M.E.S. (AE/SDO) UNDER PUBLIC HEALTH ENGINEERING DEPARTMENT, GOVERNMENT OF MIZORAM, DECEMBER, 2019.

CIVIL ENGINEERING PAPER – II

Time Allowed : 3 hours

FM : 100 PM : 40

The figures in the margin indicate full marks for the questions.

Attempt all questions.

1. Define Specific Gravity of a fluid. (3)
2. What are the Non-Newtonian fluids? Give two Examples. (3+2 =7)
3. Choose the correct answer: (2×2=4)
 - (a) Pipe flow does not have
 - (i) Free Surface
 - (ii) Friction
 - (iii) Pressure on the conduit
 - (iv) None of these
 - (b) Storm sewers is consider as
 - (i) Flow through pipe
 - (ii) Flow through as well as open channel
 - (iii) Open channel flow
 - (iv) None of these
4. Name all the classification of open channel flow. (3)
5. As per Indian Standard Bricks are classified in to four, name them. (3)
6. Choose the correct answer: (2×5=10)
 - (a) The water absorption of good stone should be less than:
 - (i) 1%
 - (ii) 5%
 - (iii) 2%
 - (iv) 3%
 - (b) The reason(s) for the popularity of brick as the construction material is that;
 - (i) They are cheap and available locally at all places.
 - (ii) They are durable and posses fairly good strength and lighter than stone.
 - (iii) They have very good insulating property against heat and sound.
 - (iv) All of the above
 - (c) The strength of steel denoted by Fe500 is;
 - (i) 500 kg/Sq. inch
 - (ii) 500 Mpa
 - (iii) 500 Kg/cm²
 - (iv) None of these
 - (d) The number of standard bricks required for 1 cum. of brick masonry is;
 - (i) 475
 - (ii) 395
 - (iii) 600
 - (iv) 500
 - (e) Hollow bricks are generally used with the purpose of;
 - (i) reducing the cost of construction
 - (ii) increasing the bearing area
 - (iii) providing insulation against the heat/cold
 - (iv) ornamental look.

7. Define any 3 (three) of the following; (3×2=6)
- (a) Gross pressure intensity of soil
 - (b) Ultimate bearing capacity
 - (c) Safe bearing capacity of soil
 - (d) Allowable bearing capacity of soil
8. In which situation of Construction Strap Footing is usually suggested. Give the difference between Combine footing and Strap footing. (2+2=4)
9. What are the main objects of treating water? (4)
10. Draw typical sequence of water treatment plants suitable to be used in hilly terrain. (10)
11. Name the five factors where the development, reliability and quality of water is mainly depends on. (5)
12. Give the in not less than 100 words economic & environmental importance of rain water harvesting in Mizoram. (5)
13. Answer any 5 (five) of the following: (5×2=10)
- (a) What is an approximate proportion of cement, Sand & concrete for M20 nominal mix cement concrete?
 - (b) What is the characteristic strength of M25 concrete?
 - (c) Why the Strength of cement decrease if the water is added less than or more than the optimum water cement ration in the concrete mix with all other conditions remains the same?
 - (d) Where the bending moment of cantilever beam is maximum?
 - (e) Write a note on curing of concrete
 - (f) Write a note on importance of maintaining clear cover for RCC work and minimum clear cover for slab, beam columns and water retaining structure?
 - (g) What is the function of stirrups on a beam?
14. Give reasons for the suitability of circular water tank than that of rectangular tank. (5)
15. Why clear cover of reinforcement steel is kept higher for water retaining structure? Also give the function water proof admixture in the cement concrete mix. (5)
16. Define storm water, give five reasons why storm water need to be deposed off quickly? (3)
17. What are the governing factor for the design of the sewerage system? (3)
18. Why egg shaped/Ovoid sewers offer greater velocities of flow even when the discharge is lest than $\frac{1}{4}$ the full. (2)
19. Define lamphole & inverted syphon. (2)
20. What are the requirement of pumping station for sewerage? (2)
21. Differentiate between BOD and COD. (2)
22. Classified methods of Sewerage disposal. (2)