

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

CIVIL ENGINEERING PAPER – I

Time Allowed : 3 hours

FM : 100 PM : 40

Marks for each question is indicated against it.

PART – A (50 MARKS)

1. (a) (i) What is the function of damp-proof courses in Building construction? Discuss Bitumen and Mastic Asphalt as damp-proofing course materials. **(4+3+3=10)**
(ii) Explain how Hardness, Structure and Presence of soluble salts tests are done on Bricks. **(3+3+4=10)**
OR
(b) (i) What is bulking of sand? If bulking of sand is 25%, calculate the yield of concrete bag (0.035 Cum) for a concrete mix of proportion 1:2:4. **(4+6=10)**
(ii) What is the effect of having a broad leaved trees close to the building foundation? What remedial action can be taken? **(6+4=10)**
2. (a) (i) Define Cross-wall construction in Building. Draw a typical cross-wall arrangement plan. **(5+5=10)**
(ii) Describe the field tests that may be done to ascertain roughly the quality of cement. **(10)**
OR
(b) (i) Explain the effect of relative humidity and temperature of the atmosphere on the moisture content of Timber. **(10)**
(ii) Draw cross-section of typical wooden stair showing Risers, Treads, Nosings, Goings, Landing, Newel post, Hand rail, Balusters, Strings and String capping. **(10)**
3. (a) Define Elastic limit, Yield point and Modulus of Resilience of materials. **(2+2+2=6)**
(b) What are the assumptions made in the determination of deflection of beams? **(4)**

PART – B (50 MARKS)

4. (a) (i) Define 'Quality'. Discuss the peculiarity and importance of Quality control in civil engineering construction. **(4+6=10)**
- (ii) What is hard water ? What are the disadvantages of hard water with regard to domestic use, Industrial use and health effects? **(4+6=10)**
- OR**
- (b) (i) Explain how in-situ density of sub-grade is measured using Sand Replacement method. **(10)**
- (ii) Describe the principle of ideal sedimentation basin with diagram. **(6+4=10)**
5. (a) (i) What are the factors influencing durability of cement concrete? What is the recommendation of IS:456:2000 for batching of concrete? **(5+5=10)**
- (ii) How net sectional area is calculated in the design of rivet jointed steel tension member for
- (i) Plates and **(5)**
- (ii) Single angle connected by one leg only. **(5)**
- OR**
- (b) (i) What is the necessity for specifying maximum and minimum tension steel in RCC Beams? What is the provision of IS:456:2000 for maximum and minimum steel reinforcement in RCC Beams? **(5+5=10)**
- (ii) What is the effect of radius of gyration of a compression steel members? Draw a typical sketch of two forms of steel compression members. **(5+2.5+2.5=10)**
6. (a) What is the significance of Plastic limit of soils? **(5)**
- (b) Discuss the effect of pore water pressure behind retaining walls. How the pore water pressure may be taken care of behind retaining walls? **(2.5+2.5= 5)**

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