

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

ENGINEERING PAPER – II
(CIVIL WING)

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. Darcy's Law is applicable for only which type of flow.
(a) Turbulent flow (b) **Laminar flow**
(c) Streamline flow (d) None of the above
2. Name the laboratory test used to find out the Maximum Dry Density:-
(a) Atterberg test (b) Vane Shear test
(c) **Standard Proctor test** (d) Core Cutter test
3. Indian Standard Code for Plain and reinforced Concrete:-
(a) IS 800 : 1984 (b) **IS 456 : 2000**
(c) IS 13920:2016 (d) IS 875 : 1987
4. For Structural member in concrete, the minimum grade of concrete should not be less than
(a) M15 (b) **M20**
(c) M25 (d) M30
5. The minimum liquid capacity of septic tank as per IS 2470 (Part 1) -1985 is
(a) 500 litre (b) **1000 litre**
(c) 1500 litre (d) 2000 litre
6. As per IS Code, thickness of wall of septic tank made of bricks should not be less than
(a) 100 mm (b) **200 mm**
(c) 300 mm (d) 400 mm
7. As per IS code, the minimum diameter of circular septic tank shall not be less than
(a) 1.25 m (b) **1.35 m**
(c) 1.45 m (d) 1.55 m

8. The minimum cover to the main bars in RCC beam should be
(a) 15 mm or dia of the bar (b) 25 mm or dia of the bar
(c) **25 mm or size of the aggregate** (d) 40 mm or dia of the bar
9. A doubly reinforced beam is economical as compared to Singly reinforced beam because
(a) Size of section is small (b) The depth of section is small
(c) **Compressive steel is under stressed** (d) Concrete is not stressed to its full
10. For design of RCC retaining wall, the maximum factor of safety against overturning is
(a) 2 (b) **2.50**
(c) 3 (d) 3.50
11. The portion of the slab constructed downward at the end of the heel slab to avoid sliding in retaining wall is called
(a) **Key** (b) $0.55 b$
(c) Cut off wall (d) Counterfort
12. To ensure uniform pressure distribution, the thickness of foundation is kept
(a) Uniform throughout (b) **Decreased towards the edges**
(c) Increased towards the edges (d) None of the above
13. The spacing of vertical stirrup in a rectangular beam is
(a) Maximum near the support (b) **Minimum near the support**
(c) Minimum near the centre (d) Maximum throughout
14. In a doubly reinforced concrete beam, the maximum shear stress occur
(a) Along the centroid
(b) Along the neutral axis
(c) On the plane between neutral axis and the compressive reinforcement
(d) **On the plane between neutral axis and tensile reinforcement**
15. According to Indian standards the specific gravity of soil is the ratio of the unit weight of the soil solids to that of water at a temperature of
(a) 4°C (b) 17°C
(c) **27°C** (d) 36°C
16. Soil which contains finest grain particles is
(a) Coarse sand (b) Gravel
(c) Silt (d) **Clay**
17. Sand with a uniformity coefficient value more than 6 can be treated as
(a) **Well graded** (b) Poorly graded
(c) Uniform (d) Ill graded
18. The Liquid limit exists for
(a) Sandy soil (b) Silty soil
(c) **Clayey soil** (d) Gravelly soil

19. The plasticity Index is equal to
(a) **Liquid limit – plastic limit** (b) Liquid limit – shrinkage limit
(c) Plastic limit – shrinkage limit (d) Liquid limit – flow index
20. Pycnometer is used to determine
(a) Void ratio (b) **Water content**
(c) Dry density (d) Degree of saturation
21. The property of soil by which water percolates through it is known as
(a) Surface tension (b) Capillarity
(c) **Permeability** (d) Seepage
22. The standard cube size for testing the compressive strength of concrete is-
(a) 100 mm × 100mm × 100 mm (b) **150mm × 150mm × 150mm**
(c) 200mm × 200mm × 200mm (d) 250mm × 250mm × 250mm
23. M20 grade of Concrete means the 28 days characteristic compressive strength of concrete is
(a) 15 N/mm² (b) **20 N/mm²**
(c) 25 N/mm² (d) 30 N/mm²
24. Slump test for Concrete is used to determine
(a) Compressive strength (b) Flexural test
(c) Shear test (d) **Workability**
25. In doubly reinforced beam, reinforcement is placed
(a) Only in the tension zone (b) Only in the compression zone
(c) **Both tension and compression zone** (d) On the neutral axis
26. Public hearing/Public Consultation for environmental clearance shall be conducted by-
(a) Divisional Forest Office
(b) **State Pollution Control Board**
(c) Non-Government Organisation
(d) Project Authority seeking Environmental clearance
27. River Valley Projects having Hydro Electric Power Generation equal to or above 50 MW is categorize as-
(a) **Category A** (b) Category B
(c) Category C (d) Category D
28. Forest (Conservation) Rules, 2003 every user agency who want to use any Forest land for non-forest purposes shall make his proposal in-
(a) **Form A** (b) Form B
(c) Form C (d) Form D
29. Proposal referred in sub-rule (2) in Forest (Conservation) Rules, 2003 involving Forest land more than _____ shall be sent by the State government to the Secretary to the Government of India, Ministry of Environment & Forest.
(a) 30 Hectare (b) **40 Hectare**
(c) 50 Hectare (d) 60 Hectare

30. The quorum of the meeting of Advisory Committee constituted under Forest (Conservation) Act, 2003. Shall be
- (a) **Three** (b) Four
(c) Five (d) Six
31. Public hearing for obtaining Environmental Clearance shall be completed within ____ from the date of receipt of request letter from the applicant
- (a) 30 days (b) **45 days**
(c) 60 days (d) 1 year
32. Expert Appraisal Committee (EAC) constituted by the Central Government for category A project shall not exceed ____ regular members.
- (a) 10 (b) **15**
(c) 20 (d) 25
33. Revised Estimate should be prepared if the original estimate is exceeded by
- (a) **10 %** (b) 15 %
(c) 20 % (d) 25 %
34. Preliminary Estimate of building is usually prepared using
- (a) Market rate (b) **Plinth area rate**
(c) Lumpsum rate (d) Percentage rate
35. In building estimate the percentage provision kept for Internal Electrification (casing capping) in RCC building is
- (a) 15 % (b) **12.50 %**
(c) 10 % (d) 7.50 %
36. If the Item of work to be included in the estimate is not available in Schedule of rates, we should use
- (a) Equivalent Item rate (b) Market rate
(c) **Analysis of rate** (d) Lumpsum rate
37. As per Land Acquisition, Rehabilitation and Resettlement Act, 2013 Rehabilitation and Resettlement Committee shall be constituted under the Chairmanship of the Collector if the land proposed to be acquired is equal to or more than
- (a) Fifty acres (b) **One hundred acres**
(c) One hundred fifty acres (d) Two hundred acres
38. In the first schedule of Land Acquisition, Rehabilitation and Resettlement Act, 2013, the factor by which the market value is to be multiplied in case of Urban areas
- (a) **One** (b) Two
(c) Three (d) Four
39. In which Schedule of The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 is given **fishing right** to affected families in case of Irrigation or hydel projects
- (a) The first Schedule (b) **The second Schedule**
(c) The third Schedule (d) The fourth Schedule

40. The standard weight of 16mm dia MS bar is
(a) 0.89 kg/m (b) **1.58 kg/m**
(c) 2.47 kg/m (d) 0.62 kgm
41. The standard weight of one bag cement is
(a) 25 kg (b) 35 kg
(c) **50 kg** (d) 60 kg
42. In estimation, unit rate of painting item is measured in
(a) Litre (b) **Sqm**
(c) Lumpsum (d) Percentage
43. For measurement of stone boulder in volume percentage of void deduction is taken as
(a) **12.50 %** (b) 15 %
(c) 13.50 % (d) 10 %
44. It is the sanction of the detailed estimate, design calculations, quantities of works, rates and cost of the work by competent authority of the engineering department.
(a) Expenditure Sanction (b) **Technical Sanction**
(c) Administrative approval (d) None of the above
45. It is the concurrence of the Government of the expenditure proposed and represents allotment of money to meet the expenditure.
(a) Administrative approval (b) Technical sanction
(c) **Expenditure sanction** (d) All the above
46. It is a statement of the various items of work giving the description, quantities and unit of rates.
(a) Bill register (b) **Bill of quantities**
(c) Schedule of rates (d) Cash memo
47. The increase or decrease of the cost above the existing cost at the certain base year in schedule of rates.
(a) **Cost Index** (b) Revised estimate
(c) Analysis of rates (d) Base Index
48. It is the area calculated by taking the external dimensions of the building at the floor level excluding plinth offsets if any
(a) Floor area (b) **Plinth area**
(c) Carpet area (d) Built up area
49. In Estimate, It specifies or describe the nature and class of work, materials to be used in the work, workmanship etc
(a) Rate (b) Analysis of rates
(c) **Specifications** (d) History & necessity

50. For obtaining Environmental clearance, Any Project activity specified in Category 'B' will be appraised at the Central level as Category 'A', if located in whole or in part within _____ from the boundary of (i) Protected area notified under Wild Life (Protection) act, 1972b (ii) Critically polluted areas as notified by the Central Pollution control Board under the water (Prevention and Control of Pollution) Act, 1974 from time to time (iii) Eco-sensitive areas as notified under sub-section (2) of section 3 of environment (Protection) Act, 1986 and (iv) Inter-State boundaries and International boundaries.

- (a) 5 km
(c) 10 km

- (b) 7 km
(d) 12 km

SECTION- B (Conventional Type) (50 Marks)

*This Section should be answered only on the **Answer Sheet** provided.
Marks for each question is indicated against it.*

Answer all the Questions (Scientific calculator may be used if required)

1. Draw a neat sketch showing the active and Passive state of Plastic equilibrium behind a Retaining wall. (6)
2. Define the term Permeability? (3)
3. Calculate the Maximum Bending Moment in a simply supported beam having a live load of 15 kN/m and a dead load of 5 kN/m. The effective span of the beam is 5.50m. (6)
4. Darcy's Law is applicable for only which type of flow? (3)
5. Name the three division of soil according to Unified Soil Classification / Indian Standard classification? (3)
6. Name the laboratory test used to find out the Maximum Dry Density? (2)
7. Name any four laboratory test for cement. (2)
8. Calculate the cost of earthwork for a forebay site. The Cross sectional area taken at an uniform interval of 10 m c/c. (10)
Area 1 - 28 sqm
Area 2 - 32 sqm
Area 3 - 18 sqm

Assume the rate of earthwork is Rs 100 per cum

9. Analyse the rate for a Half Brick wall with cement mortar 1 : 3 in sqm. (10)

Requirement of Material for 100 sqm

Particulars	Quantity	Rate
(i) Brick First class	1000	Rs 20/No
(ii) Cement	20 bags	Rs 600 per bag
(iii) Sand	2.50 cum	Rs 3000 per cum
(iv) Mason	1.50 Mandays	Rs 1000 per day
(v) Labour	3 Mandays	Rs 600 per day
(vi) Water charge	1 %	
(vii) CP & OH	10 %	

10. What are the four stages of process for obtaining environmental clearance for a new project ? (5)

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