

MIZORAM PUBLIC SERVICE COMMISSION

TECHNICAL COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO THE POST OF JUNIOR ENGINEER UNDER PUBLIC HEALTH ENGINEERING DEPARTMENT, GOVERNMENT OF MIZORAM. JUNE-2019

CIVIL ENGINEERING

PAPER - I

Time Allowed : 2 hours

Full Marks : 150

Attempt all questions.

All questions carry equal marks of two (2) each

- Size of modular brick is
 - 200mm×100mm×100mm
 - 190mm×90mm×90mm
 - 190mm×100mm×100mm
 - 200mm×90mm×90mm
- Water absorption of good quality stone should be below
 - 20%
 - 15%
 - 10%
 - 5%
- For all wall thickness, the bond considered to be the strongest is:-
 - Flemish bond.
 - English bond.
 - Facing bond.
 - Stretcher bond.
- First class brick when immersed in water for one hour should not absorb water more than:-
 - 1/3th of their weight.
 - 1/4th of their weight.
 - 1/5th of their weight.
 - 1/6th of their weight
- Commonly used thinner in paint industry is
 - Naptha
 - Petrol
 - Methylated spirit
 - Turpentine
- Choose the wrong statement :-
 - The shrinkage and swelling in wood is uniform in all directions.
 - The strength and elastic properties of wood is not uniform in all directions.
 - Wood being a hygroscopic material adjusts its moisture content to the humidity.
 - The absorption of moisture by wood is accompanied by swelling and desorption by shrinkage.
- The most vulnerable point/section in a ceiling to cracking is :-
 - At the joint between the two boards
 - At the point where the ceiling is fixed to the joist
 - At the junction between the ceiling and wall
 - At the centre of the horizontal plane of the ceiling
- The Aggregate Impact Value of aggregate to be used for concrete (other than for wearing surface) as per IS: 383 -1970 shall not exceed
 - 35%
 - 45%
 - 30%
 - 60%

9. According to IS:383 -1970, which grading zone of fine aggregate shall not be used for reinforced concrete?
- (a) Grading Zone I (b) Grading Zone II
(c) Grading Zone III (d) Grading Zone IV
10. The initial and Final Setting time of cement when tested with Vicat Apparatus shall be
- (a) Not less than 30 minutes and not more than 600 minutes
(b) Not more than 30 minutes and not less than 600 minutes
(c) Not less than 30 minutes and not less than 600 minutes
(d) Not less than 30 minutes and not more than 600 minutes
11. Which IS Sieve size differentiate coarse and fine aggregate?
- (a) Aggregate passing 2.36mm (b) Aggregate passing 4.75mm
(c) Aggregate passing 1.18mm (d) Aggregate passing 10mm
12. The purpose of wood seasoning is
- (a) Creosoting (b) Painting
(c) Tarring (d) Reducing/removing sap
13. A temporary rigid structure having platforms to enable masons to work at different height of a building, is known as
- (a) Scaffolding (b) Dead shore
(c) Raking shore (d) Underpinning
14. The type of bond in a brick masonry containing alternate courses of stretchers and headers, is called
- (a) Flemish Bond (b) English Bond
(c) Stretcher Bond (d) Header Bond
15. Ornamental moulded course placed on the top of a wall is
- (a) Cornice (b) Coping
(c) Frieze (d) Lintel
16. If the Plasticity Index of a soil is less than 7, the soil may be classified as
- (a) Highly Plastic (b) Medium Plastic
(c) Low Plastic (d) Non-Plastic
17. The Index that is used to indicate the consistency of undisturbed soils in the field is
- (a) Plasticity (b) Liquidity Index
(c) Toughness Index (d) Sensitivity
18. Permeability of soil is the rate at which water flows through it under the action of hydraulic
- (a) Pressure (b) Flow
(c) Gradient (d) Impact
19. The ratio between volume of voids in soil and volume of solid particles is known as
- (a) Density (b) Specific gravity
(c) Void Ration (d) Porosity
20. Specific gravity of sand is generally
- (a) 2.60 (b) 3.00
(c) 2.20 (d) 2.00

21. Liquid and Plastic Limits exist in _____ soil
- (a) Gravel (b) Clay
(c) Silty (d) Sandy
22. The moisture content at which specified amount of compaction produces maximum dry density is known as
- (a) Specific Moisture Content (b) Retained Moisture Content
(c) Absolute Moisture Content (d) Optimum Moisture Content
23. A well-graded soil has co-efficient of expansion between
- (a) 4 to 5 (b) 1 to 3
(c) 3 to 4 (d) 3.5 to 4
24. Bearing capacity of soil depends upon _____ of particles
- (a) Shape (b) Cohesion
(c) Size (d) Specific gravity
25. Field shear test for clays in which a vane consisting of two or more blades fixed at right angles is used is known as _____ test
- (a) Bearing (b) Unconfined Compression
(c) Vane (d) Penetration
26. Total active pressure due to dry backfill, acting at $H/3$ above the base is directly proportional to
- (a) H^3 (b) H
(c) H^2 (d) $H^{1/2}$
27. The maximum pressure which a soil can bear without causing shear failure is termed as
- (a) Safe Bearing Pressure (b) Ultimate Bearing Pressure
(c) Failure Capacity (d) Ultimate Shearing Capacity
28. The ultimate bearing capacity is clearly defined only in the case of
- (a) Local Shear (b) Punching Shear
(c) General Shear (d) All of the above
29. The factor of safety to be adopted while determining the bearing capacity of soils is
- (a) 2.50 to 5 (b) 4 to 6
(c) 3 to 6 (d) 2 to 4
30. Choose the most appropriate type of foundation in a soil of low bearing capacity or where columns are closely spaced in both directions
- (a) Strip Foundation (b) Pad Foundations
(c) Bearing Piles (d) Raft Foundations
31. What is hydrological cycle?
- (a) Processes involved in the transfer of moisture from sea to land.
(b) Processes involved in the transfer of moisture from sea to back to sea again.
(c) Processes involved in the transfer of water from snow melt in the mountains to sea.
(d) Processes involved in the transfer of moisture from sea to land and back to sea again.
32. Isobar is a line which joins points of equal
- (a) Rainfall depth (b) Temperature
(c) Humidity (d) Atmosphere pressure

33. A plot between rainfall intensity versus time is called
(a) Hydrograph (b) Mass curve
(c) Hyetograph (d) Isohyets
34. A hydrograph is a plot of
(a) Rainfall intensity against time (b) Stream discharge against time
(c) Cumulative rainfall against time (d) Cumulative discharge against time
35. If the terrace area is 100 sq.m and annual rainfall is 1000mm and harvest efficiency is 60%, the amount of rainwater that can be harvested is
(a) 42,000 litres (b) 70,000 litres
(c) 60,000 litres (d) 62,000 litres
36. What is/are benefits of rainwater harvesting?
(a) Flood mitigation (b) Increasing ground water levels
(c) Greater water availability (d) All of these
37. Rain water is safe for drinking if
(a) Rain water is not exposed to sun
(b) Rainwater is stored in ferro cement tank
(c) Rainwater is disinfected through chlorination
(d) All of these
38. Precipitation caused due to striking of air masses with a topographical feature is called
(a) Orographic precipitation (b) Convective precipitation
(c) Cyclonic precipitation (d) None of these
39. The runoff is affected by
(a) Size of the basin (b) Shape of the basin
(c) Elevation of water shed (d) All of these
40. In India, rainfall is generally recorded at
(a) 8 AM (b) 12 Noon
(c) 4 PM (d) 8 PM
41. Specific capacity is a quantity
(a) Which determines how a waterwell dries up in a drawdown
(b) Which a waterwell can produce per unit drawdown
(c) Which determines the rate of recharging of a waterwell
(d) None of these
42. What is an aquifer?
(a) A body of saturated rock through which water can easily move
(b) A storage of water between two rock layers
(c) A depression between two rock layers where water is stored.
(d) All of these
43. The rate of evaporation from a reservoir can be determined by
(a) Pan-measurement method (b) Empirical formulae
(c) Storage equation method (d) All of these

44. Dicken's formula for high flood estimate is useful only for the catchments in
(a) Southern India (b) Northern India
(c) Eastern India (d) Western India
45. The time required by rain water to reach the outlet of a drainage basin is generally called
(a) Time of concentration (b) Time of overland flow
(c) Duration of rainfall (d) None of these
46. While casting concrete, concrete should not be dropped from a height greater than
(a) 1.00m (b) 1.20m
(c) 1.50m (d) 1.25 m
47. According to IS 456:2000, the minimum no of bars in a circular column with helical pitch shall be
(a) 4 nos (b) 5 nos
(c) 6 nos (d) 8 nos
48. The minimum percentage of reinforcement in foundation using Fe415 is
(a) 0.15% (b) 0.12%
(c) 0.125% (d) 0.15%
49. A two-way slab supported on all four sides with corners not held down is designed by
(a) Grasshoff Method (b) Rankine-Grasshoff Method
(c) Rankine Method (d) Pigeaud Method
50. Permissible bond stress in concrete for compression bar is increased by
(a) 15% (b) 20%
(c) 25% (d) 30 %
51. The limiting values of $x_{u\max}/d$ in beam for Fe 415 is
(a) 0.55 (b) 0.48
(c) 0.46 (d) 0.45
52. The strength of a compression member with helical reinforcements shall be taken as _____ times the strength of similar member with lateral ties
(a) 1.25 (b) 1.10
(c) 1.05 (d) 1.10
53. The characteristic load is defined as the load that has a _____% probability of not being exceeded during the life of the structure
(a) 90% (b) 92%
(c) 100% (d) 95%
54. While designing foundation, two-way shear check shall be made at a distance of _____ from the face of column (where 'd' is the effective depth of the footing)
(a) d (b) d/2
(c) d/4 (d) d/5
55. The thickness of the edge of plain and reinforced foundation on soil shall not be less than
(a) 200mm (b) 175mm
(c) 150mm (d) 250mm

56. In a rectangular water tank, maximum Bending Moment occurs when the depth of water tank is equal to _____ the length of the short wall
- (a) One- fourth (b) One – third
(c) One – half (d) Three – fourth
57. In an under reinforced beam section,
- (a) Steel is insufficient (b) Steel yields first before failure
(c) Concrete is crushed first before failure (d) Steel and concrete fail at the same time
58. If f_{ck} is the characteristic strength of the concrete, the strength of concrete in the actual structure shall be taken as
- (a) $0.87 f_{ck}$ (b) $0.67 f_{ck}$
(c) $0.75 f_{ck}$ (d) $0.80 f_{ck}$
59. The percentage of steel in a column shall be in the range of
- (a) 0.60% to 8% of concrete area (b) 0.80% to 6% of concrete area
(c) 0.75% to 8% of concrete area (d) 0.80% to 7% of concrete area
60. The minimum clear cover to the reinforcements in RCC Water tank shall be
- (a) 25mm or diameter of the bar, whichever is greater
(b) 15mm or diameter of the bar, whichever is greater
(c) 40mm or diameter of the bar, whichever is greater
(d) 50mm or diameter of the bar, whichever is greater
61. RCC cantilever retaining wall can be used for a height upto
- (a) 4m (b) 5m
(c) 6m (d) 7m
62. Weep holes are provided in the retaining walls
- (a) To reduce active earth pressure on the walls
(b) To reduce the built up hydrostatic pressure
(c) To provide better compaction
(d) To increase passive earth pressure
63. The maximum permissible eccentricity of a retaining wall of width 'B' to avoid failure in tension is
- (a) $B/2$ (b) $B/3$
(c) $B/6$ (d) $B/5$
64. For sand having an internal friction of 30° , the ration of passive to active lateral earth pressure will be
- (a) 1 (b) 3
(c) 9 (d) 6
65. The failure of slope takes place mainly due to
- (a) The action of gravitational forces (b) The seepage forces within the soil
(c) Due to excessive cutting below the slope (d) Due to overburden pressure on the slope
66. In stability computations of slope, the curve representing the real surface of sliding is usually represented by
- (a) Parabola (b) Arc of circle
(c) Cubic parabola (d) None of these

67. If the curve of the failure passes through the toe, the failure is known as
- (a) Face failure
 - (b) Base failure
 - (c) Toe failure
 - (d) Foundation failure
68. Masonry or RCC structures supporting the uphill slopes along a road are termed as
- (a) Toe wall
 - (b) Retaining wall
 - (c) Breast wall
 - (d) Revetment wall
69. A low wall constructed at the bottom of an embankment or at the end of apron of a culvert is known as
- (a) Check wall
 - (b) Toe wall
 - (c) Breast wall
 - (d) Retaining wall
70. Pavement walls is defined as
- (a) Permanent structure to prevent subsidence that commonly occurs near water ways.
 - (b) Permanent structure built to prevent erosion of earth cutting slopes on the road.
 - (c) Permanent structure covering earth filling behind retaining walls.
 - (d) All of these
71. Gravity wall comprising a series of stacked members creating hollow cells filled with soil or rock is known as
- (a) Dry masonry retaining wall
 - (b) Grid walls
 - (c) Crib walls
 - (d) Geogrids
72. The geological factors that determine the degree of stability of slope is
- (a) Type of rocks
 - (b) Orientation of bedding planes and joints
 - (c) The presence of faults & folds
 - (d) All of these
73. In general, slope often fails by
- (a) Rotation
 - (b) Toppling
 - (c) Slides
 - (d) Lateral spreads
74. Advantage of sausage wall over normal stone masonry wall is/are
- (a) Sausage wall can undergo large deformation without crackling & are flexible.
 - (b) Sausage wall did not allow free drainage of water.
 - (c) The cost is cheaper for the same height in comparison to normal stone masonry wall.
 - (d) Sausage wall is easier to construct than stone masonry retaining wall.
75. For slope stability analysis, the method mostly used is
- (a) Deformation (stress) Analysis
 - (b) Slip circle
 - (c) Wedge theory
 - (d) All of these

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