MIZORAM PUBLIC SERVICE COMMISSION

TECHNICAL COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO JUNIOR GRADE OF MIZORAM ENGINEERING SERVICE (CIVIL) CONTRACT UNDER DISASTER MANAGEMENT & REHABILITATION DEPARTMENT, JANUARY 2015.

CIVIL ENGINEERING
PAPER - III

Time Allowed : 2 hours | Full Marks : 200

All questions carry equal marks of 2 each.

Attempt all questions.

1. The inventor of the term 'soil mechanics' was
(a) Kray
(b) Dr. Karl Terzaghi
(c) Leygue
(d) Fellenius

2. Pick out the cohesionless soil from the following
(a) Sand
(b) Silt
(c) Clay
(d) Clay and silt

3. The ratio of the volume of voids to the volume of soil solids in a given soil mass is known as
(a) Porosity
(b) Specific gravity
(c) Void ratio
(d) Water content

4. The relationship between void ratio(e) and porosity ratio(n) is given by
(a) $n = 1+e/1-e$
(b) $e = 1+n/1-e$
(c) $2 = e/1-e$
(d) $e = n(1+e)$

5. The specific gravity of sand is approximately
(a) 1.6
(b) 2.0
(c) 2.4
(d) 2.6

6. The liquid and plastic limits exist in
(a) Sandy soils
(b) Silty soils
(c) Gravel soils
(d) Clay soils

7. Soils containing organic matters
(a) are of spongy nature
(b) swell with decrease of moisture
(c) shrink with increase of moisture content
(d) none of these

8. The property of a soil which permits water to percolate through it is called
(a) Moisture content
(b) Permeability
(c) Capillarity
(d) None of these

9. The test of soil to distinguish silt from clay is called
(a) Dispersion test
(b) Plasticity test
(c) Dilatancy test
(d) Silt test

10. If the plasticity index of a soil sample is less than 7, the soil may be classified as
    (a) Highly plastic
    (b) Medium plastic
    (c) Low plastic
    (d) Non- plastic

11. If the rate of compression of the soil layer is controlled solely by the flow of water under the induced hydraulic gradient the process is referred to as
    (a) Immediate consolidation
    (b) Primary consolidation
    (c) Secondary consolidation
    (d) Permanent consolidation

12. Under passive earth pressure, backfill behind the retaining wall is in the state of
    (a) Compression
    (b) Tension
    (c) Rest
    (d) Compression and tension alternatively

13. As thumb rules the depth of sub-surface investigation for multi-storey structure shall be
    (a) Equal to 4 times the probable footing width but not less than 6m below the lowest part of the foundation
    (b) At least 50% of the boring should be extended to a depth not less than 15m below the lowest part of the foundation
    (c) A minimum depth of 3m in any kind of soil
    (d) None of these

14. Bearing capacity failure of soil which consist of a continuous slip surface from one edge of the footing to the ground surface is
    (a) General shear failure
    (b) Local shear failure
    (c) Punching shear failure
    (d) Principal shear failure

15. A triaxial shear test is preferred to direct shear test because
    (a) It can be performed under all the three drainage conditions with complete control
    (b) Precise measurement of the pore pressure and change in volume during test is not possible
    (c) Stress distribution on the failure plane is non-uniform
    (d) None of these

16. The angle of internal friction is least for
    (a) Angular-grained loose sand
    (b) Angular-grained dense sand
    (c) Round grained dense sand
    (d) Clays

17. The lateral earth pressure on retaining walls
    (a) Is equal to mass of the soil retained
    (b) Proportional to the depth of the soil
    (c) Proportional to the square of the depth of the soil
    (d) Proportional to the internal friction of the soil

18. Failure of the stability of slopes generally occurs along
    (a) A vertical surface
    (b) A horizontal surface
    (c) A curved surface
    (d) All the surfaces

19. Pile foundations are generally preferred for
    (a) Bridge foundation
    (b) Skyscraper buildings
    (c) Residential buildings
    (d) Runways

20. A shallow foundation is defined as a foundation which
(a) Has low bearing capacity
(b) Is resting on the ground surface
(c) Has a depth of embedment less than its width
(d) Causes less settlement

21. By rule of thumb, the minimum horizontal spacing of the old and new footing should be equal to
(a) One half of the width of the wider one
(b) Width of the wider one
(c) Thrice the width of the wider one
(d) Twice the width of the wider one

22. In bridge foundation, if there is a comparatively deep scour, type of foundation normally adopted is
(a) Under reemed piles
(b) Pre-stressed piles
(c) Piles in a group
(d) Well foundation

23. Stone column as a ground improvement technique is generally adopted in
(a) Cohesionless soil
(b) Granular soil
(c) Clayey soil
(d) Any kind of soil

24. The application of surcharges in a sand drain
(a) Squeezes out water in the radial directions to the nearest sand drain
(b) Squeezes out water horizontally to the nearest sand drain
(c) Squeezes out water downward from the sand blanket
(d) Non of these

25. Compaction piles for ground improvement technique are found to be more effective in densifying
(a) Partially saturated granular soils
(b) Saturated granular soils
(c) Partially saturated cohesive soils
(d) Saturated cohesive soils

26. If the pores of a soil are completely full of air only, the soil is said to be
(a) Fully saturated soil
(b) Wet soil
(c) Partially saturated soil
(d) Dry soil

27. If the hydraulic gradient is unity, then the ratio of flow across unit area of soil is called
(a) Co-efficient of seepage
(b) Co-efficient of permeability
(c) Co-efficient of viscosity
(d) Co-efficient of discharge

28. Most important factor for a foundation engineer is to know
(a) Bearing capacity of soil
(b) Stability of soil
(c) Seepage through soil
(d) Structure of soil

29. Which type of foundation is preferable on soil of poor bearing capacity?
(a) Raft
(b) Stepped
(c) Grillage
(d) All of these

30. The foundation of a structure can settle due to
(a) Inclined movement
(b) Vertical movement
(c) Swinging movement
(d) None of these

31. Principle of surveying followed to prevent accumulation of error is
(a) To work from whole to part
(b) To work from part to whole
(c) None of these
(d) Both (a) and (b)

32. Geodetic survey is different from plane surveying because

(a) Very large area is covered
(b) The topography is bad
(c) The curvature of the earth is considered
(d) Of the large difference of elevations

33. If the scale of a map in surveying is 1cm = 100m, the representative fraction will be

(a) 1/100
(b) 1/1000
(c) 1/10000
(d) 1/100000

34. If the chain is too long in surveying work, the measured length is

(a) Less than its true length
(b) Greater than its true length
(c) Negligibly greater than its true length
(d) None of these

35. The lines connecting points at which the declination is zero is

(a) Agonic lines
(b) Isogonic lines
(c) Dip
(d) Alidade

36. If the contour interval is 2m, the distance between the point on the first contour line and that on the next contour line in a gradient of 1:30 will be

(a) 15m
(b) 30m
(c) 60m
(d) 90m

37. The latitude of a place is positive when it is at

(a) East of equator
(b) West of equator
(c) North of equator
(d) South of equator

38. A survey in which horizontal and vertical locations of points are fixed by linear and angular measurement is known as

(a) Geodetic survey
(b) Cadastral survey
(c) Topographical survey
(d) City survey

39. A survey in which observations of the heavenly bodies such as sun or any other fixed star is done is known as

(a) Celestial survey
(b) Astronomical survey
(c) Photographic survey
(d) Astrological survey

40. The scale on which three dimensions can be measured is known as

(a) Diagonal scale
(b) Plain scale
(c) Chord scale
(d) Vernier scale

41. The length of an Engineer's chain should be

(a) 100 ft
(b) 66 ft
(c) 30 m
(d) 20 m

42. Metallic tape are made of

(a) Steel
(b) Invar
(c) Cloth and wires
(d) Nickel

43. The first observation taken on a turning point in survey is

(a) Fore sight
(b) Back sight
(c) Both (a) and (b)
(d) None of these

44. The tacheometric method is more suitable method for preparing the contour map of a
(a) Valley
(b) Hill
(c) Ridge
(d) Plain surface

45. In a theodolite, the line passing through the intersection of the horizontal and vertical cross-hairs and the optical centre of the object glass and its continuation is known as
(a) Line of collimation
(b) Line of sight
(c) Both (a) and (b)
(d) None of these

46. The Global positioning system is recording data from
(a) Remote sensing satellite
(b) Communication satellite
(c) Geo-synchronized satellite
(d) Polar satellite

47. Earthwork in plinth feeling in building is calculated by taking
(a) Centre to centre distance of the walls
(b) Internal dimensions in between plinth walls
(c) Internal dimensions of the room
(d) External dimensions of the room

48. If the quantity of earth filling is 250 cum. Height of earth filling in plinth is 30cm and the height of sand filling is 15cm. Then, the quantity of sand filling in plinth is
(a) 100 cum
(b) 120 cum
(c) 125 cum
(d) 130 cum

49. If the loose quantity of water bound macadam road is 600 cum, the compacted quantity approximately will be
(a) 100 cum
(b) 200 cum
(c) 300 cum
(d) 400 cum

50. Travelling expenses for the sake of analysis of rates would be under the category
(a) Job overhead
(b) General overhead
(c) Miscellaneous overhead
(d) Contingency overhead

51. An imaginary surface in an airport extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 21 for a horizontal distance of 4000 ft is known as
(a) Primary surface
(b) Horizontal surface
(c) Conical surface
(d) Transitional surface

52. All other things being equal, the runway configuration most desirable from the stand point of capacity and air traffic control is
(a) Single-direction runway
(b) Two parallel runways-even threshold
(c) Two parallel runways-staggered threshold
(d) Four parallel runways

53. The colour of landing direction lights in heliports is
(a) White
(b) Red
(c) Yellow
(d) Green

54. The taxiway is the strip of pavement which connects
(a) The city to the airport
(b) The runway to the apron
(c) The terminal building to taxi stand
(d) None of these

55. Pick out the odd. Airports are classified on the basis of
(a) Runway length
(b) Pavement strength
(c) Expected air traffic
(d) None of these

56. The dock that projects into the ship basin at right angles or oblique from shore is called

(a) Wharves
(b) Quay
(c) Jetty
(d) Cat walk

57. The equilibrium cant in railway track is provided on the basis of

(a) Maximum speed
(b) Minimum speed
(c) Average speed
(d) Normal speed

58. The object of providing turn out in railway tract is

(a) To transfer the loads from rails to the ballast and sub-grade below
(b) For safe movement of trains in either direction on both the tracts
(c) For holding double-headed and bull-headed rails
(d) To provide temporary storage of wagons

59. In broad gauge, the clear horizontal distance between the inner faces of two parallel rails forming the track is

(a) 1.0 m
(b) 0.792 m
(c) 0.6096 m
(d) 1.676 m

60. Generally the rail sections used in India are

(a) Double loaded
(b) Bull headed
(c) Flat footed
(d) All of these

61. The compulsory test conducted for rails is

(a) Hammer test
(b) Falling weight test
(c) Tensile test
(d) Impact test

62. Spacing of sleepers is kept

(a) Same throughout the length of rail
(b) Closer near the joints
(c) Closer at the middle of rails
(d) None of these

63. The yard where trains and other loads are received, sorted out, trains formed and dispatched onwards are known as

(a) Station yard
(b) Marshalling yard
(c) Locomotive yard
(d) Goods yard

64. Mountainous terrains are hilly zones with cross slope of hill face

(a) Greater than 60 %
(b) Below 10%
(c) Between 25% to 10%
(d) Between 60% to 25%

65. The minimum design speed of hair-pin bend is

(a) 15 km/hr
(b) 20 km/hr
(c) 25 km/hr
(d) 30 km/hr

66. The roads connecting capitals for states is known as

(a) National highway
(b) Provincial highway
(c) State highway
(d) Express highway

67. An access from a road to private property is known as

(a) Bypass road
(b) Fly over
(c) Drive way
(d) Loop road

68. The highest point on a carriageway is known as
(a) Camber
(b) Crown
(c) Superelevation
(d) Gradient

69. The rate of rise or fall of a road along its alignment is
(a) Super-elevation
(b) Side slope
(c) Camber
(d) Gradient

70. For a waterbound macadam road, the recommended camber is
(a) 1 in 24 to 1 in 30
(b) 1 in 30 to 1 in 48
(c) 1 in 60 to 1 in 80
(d) 1 in 80 to 1 in 120

71. Mandatory signs are displayed on a disc having diameter of
(a) 30 cm
(b) 50 cm
(c) 100 cm
(d) 60 cm

72. Generally, the premix carpet laid in India is of thickness
(a) 5 to 7.5 cm
(b) 10 cm
(c) 15 cm
(d) 2 cm

73. If a cement concrete road is properly constructed and maintained, then its expected life will be
(a) One year
(b) 10 years
(c) 20 years
(d) 30 to 40 years

74. A wall constructed to retain the earth from slippage on the hill side of a roadway is called
(a) Breast wall
(b) Retaining wall
(c) Parapet wall
(d) None of these

75. In hill roads, minimum sight distance required is
(a) Stopping sight distance
(b) Passing sight distance
(c) Breaking distance
(d) None of these

76. If super-elevation is not provided on a horizontal curve of a highway, then on which portion of the road are pot holes likely to develop?
(a) Outer edge of the road
(b) Inner edge of the road
(c) Centre of the road
(d) Shoulder of the road

77. A contraction joint is provided in concrete pavement to
(a) Prevent contraction of the pavement
(b) Permit cracking at the edge
(c) Lower the bending moment in the pavement to reduce pavement thickness
(d) Lower the temperature gradient across the depth of the pavement

78. Benkelman beam deflection method is used for design of
(a) Rigid overlay on rigid pavement
(b) Flexible overlay on flexible pavement
(c) Flexible overlay on rigid pavement
(d) Rigid overlay on flexible pavement

79. The average of a number of spot speed measurements in traffic survey is
(a) Space means speed
(b) Running speed
(c) Time mean speed
(d) Journey speed

80. Tunneling method suitable for all classes of moderately firm or hard soils, where height of over burden is small is

(a) Belgian method
(b) Linear plate method
(c) Fore polling method
(d) Army method

81. The exterior angle or corner of a wall in Masonry work is called

(a) Quoins
(b) Hearting
(c) Closer
(d) Bed

82. Water retentivity for brick masonry should not be less than

(a) 50%
(b) 60%
(c) 70%
(d) 80%

83. For earthquake resistant masonry buildings, the vertical distance between openings one above the other in a load bearing wall shall not be less than

(a) 50 cm
(b) 60 cm
(c) 75 cm
(d) 100 cm

84. A joint parallel to the face of the masonry wall is called

(a) Bed joint
(b) Cross joint
(c) Wall joint
(d) None of these

85. Direct load carrying capacity of a brick masonry wall standing freely as against when it supports RC slab will be

(a) More
(b) Less
(c) The same in both cases
(d) 100%

86. A masonry work consisting of accurately dressed stone with extremely fine bed and end joints is

(a) Regular coursed rubble masonry
(b) Dry rubble masonry
(c) Square rubble masonry
(d) Ashlar masonry

87. First class brick when immersed in water for one hour should not absorb water more than

(a) 1/3 of their weight
(b) 1/4 of their weight
(c) 1/5 of their weight
(d) 1/6 of their weight

88. A wall may be defined as a vertical load bearing member when

(a) Width of which exceeds four times the thickness
(b) Width of which exceeds six times the thickness
(c) Width of which do not exceed four times the thickness
(d) Width of which do not exceed six times the thickness

89. A retaining wall built parallel to the centre line of road is called

(a) Breast wall
(b) Revetment wall
(c) Return wall
(d) Toe wall

90. The process of removal of centering for an arch having span more than 7 m is

(a) Loosening
(b) Lagging
(c) Relieving
(d) Sand box

91. On a bar chart the various activities of a project are shown by

(a) Shaded area
(b) Horizontal lines
(c) Vertical lines
(d) Dot marks

92. CPM means

(a) Controlling planning and maintenance
(b) Computer programme mode
(c) Critical path method
(d) Crucial project management

93. An example for a parallel activity is

(a) Completing ground floor and starting first floor construction
(b) Wall construction and carpentary work of doors and windows
(c) Completion of flooring and initiating white washing
(d) Digging of a well and construction of septic tank

94. If there will be numerous small jobs in different locations, the most suitable power shovel would be

(a) Crawler-mounted
(b) Smooth wheel-mounted
(c) Rubber tire-mounted
(d) All of these

95. The size of bulldozer is indicated by

(a) Length and height of blade
(b) Type of mounting
(c) Horse power of engine
(d) Kind of control whether cable or hydraulic

96. In case of mass concrete work, most effective type of vibration would be

(a) Hand tamping
(b) Immersion
(c) External
(d) Pneumatic placer

97. The type of roller suitable for cohesive soil would be

(a) Vibrating compactors
(b) Smooth wheel rollers
(c) Tamping rollers
(d) None of these

98. To prepare a job layout for a project, the general office and warehouse should be located

(a) Near the main entrance
(b) Somewhere near the central portion
(c) Isolated from the other activities
(d) Near the exit if provided

99. The amount of time by which the start of the activity may be delayed without interfering with the start of any succeeding activity in CPM network is called

(a) Total float
(b) Free float
(c) Interfering float
(d) Effective float

100. The first stage of a construction is

(a) Preparation of estimate
(b) Survey of the site
(c) Initiation of proposal
(d) Allotment of fund

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