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WB Municipal Service Commission

**Previous Year Paper
JE (Civil) 18 Dec 2022**



1. The transition curve used in the horizontal alignment of highways as per IRC recommendations is

- lemniscate
- spiral
- cubic parabola
- parabola

2. Deflection can be controlled by using the appropriate

- aspect ratio
- modular ratio
- span/depth ratio
- water/cement ratio

3. Excess of silica in brick earth results in

- cracking and warping of bricks.
- loss of cohesion.
- enhance the impermeability of bricks.
- None of the above

4. For a saturated cohesive soil, a triaxial test yields the angle of internal friction (ϕ) as zero. The conducted test is

- Consolidated Drained (CD) test.
- Consolidated Undrained (CU) test.
- Unconfined Compression (UC) test.
- Unconsolidated Undrained (UU) test.

5. Polar moment of inertia of a circular area of dia 'D' is

- $\frac{\pi D^4}{8}$
- $\frac{\pi D^4}{32}$
- $\frac{\pi D^4}{64}$
- $\frac{\pi D^4}{128}$

6. For a maximum horizontal range of a projectile, the angle of projection should be

- 30°
- 45°
- 60°
- 75°

7. At hinge in a beam

- BM is zero
- BM is maximum
- SF is zero
- None of these

8. The lower water cement ratio in concrete causes

- smaller creep and shrinkage.
- improved frost resistance.
- greater density and smaller permeability.
- All of these

9. The soil having more plasticity index is

- sand
- silt
- very fine sand
- clay

10. Which test is carried out to know the resistance to flow of the given bituminous material?

- Softening point
- Penetration
- Ductility
- Viscosity

11. Cleaning period for a rapid sand filter is taken as—

- 2 to 3 hours
- 2 to 3 weeks
- 2 to 3 days
- 2 to 3 months

12. For controlling algae, the chemical most commonly used is
 (A) Lime
 (B) Alum
 (C) Copper sulphate
 (D) Bleaching powder

13. The maximum slenderness ratio in a tension member where reversal of stress is due to loads other than wind or seismic is
 (A) 180
 (B) 300
 (C) 350
 (D) 100

14. The capacity of flushing cisterns for urinals is generally
 (A) 1 litre
 (B) 5 litres
 (C) 15 litres
 (D) 40 litres

15. Centre of gravity of a solid circular cone of height ' h ' from the circular base of radius ' r ' is at a distance of
 (A) $\frac{1}{4r}$
 (B) $\frac{1}{4h}$
 (C) $\frac{2}{3h}$
 (D) $\frac{3}{8r}$

16. Minimum grade of concrete to be used in reinforced concrete as per IS: 456-2000 is
 (A) M 15
 (B) M 20
 (C) M 10
 (D) M 25

17. Maximum permissible limit of magnesia content in ordinary Portland cement is
 (A) 4%
 (B) 6%
 (C) 8%
 (D) 10%

18. The Gale method of traversing consists of plotting the points by
 (A) independent co-ordinates.
 (B) consecutive co-ordinates.
 (C) Both independent and consecutive co-ordinates.
 (D) None of these

19. Which of the following is a weakness of bar chart?
 (A) Interdependence of activities
 (B) Project progress
 (C) Uncertainties
 (D) All of the above

20. The shear stress in a symmetrical 'I' section of a beam is maximum at
 (A) soffit of the flange.
 (B) junction of the flange and web.
 (C) neutral axis.
 (D) top fibre of the upper flange.

21. The bricks having one or two edges rounded for use in slightly curved corners are called
 (A) Bull nose
 (B) Closer
 (C) Round nose
 (D) Specific nose

22. In a RCC beam, side face reinforcement is provided if its depth exceeds
 (A) 300 mm
 (B) 500 mm
 (C) 700 mm
 (D) 750 mm

23. The maximum size of clay particle is
 (A) 0.1 mm
 (B) 0.03 mm
 (C) 0.002 mm
 (D) 0.0002 mm

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24. With the rise of temperature the sensitivity of a bubble tube

- decreases
- increases
- remains unchanged
- None of the above

25. When the both ends of a column are fixed, the crippling load is P . If one end of the column is made free, the value of crippling load will be changed to

- $\frac{P}{16}$
- $\frac{P}{4}$
- $\frac{P}{2}$
- $4P$

26. Minimum thickness of load bearing RCC wall should be

- 50mm
- 100mm
- 150mm
- 200mm

27. 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?

- Outer edge of road
- Inner edge of road
- Centre of road
- Shoulder of road

28. The field test for the quality of cement consists in putting a small quality of cement in a bucket containing water, a good quality cement will

- float in water surface.
- immediately dissolve in the water.
- sink at the bottom of bucket.
- produce effervescence.

29. The maximum total settlement for isolated foundations on clayey soils should be limited to

- 25 mm
- 40 mm
- 65 mm
- 100 mm

30. Compaction factor of 0.855 indicates a mix of

- medium workability
- low workability
- high workability
- very low workability

31. Error in Latitude is difference between

- $(\Sigma N - \Sigma S)$
- $(\Sigma E - \Sigma W)$
- $(\Sigma N - \Sigma E)$
- $(\Sigma S - \Sigma W)$

32. The spacing of steel bars in coarse screens used for the treatment of sewage is

- 10mm
- 20 mm
- 30 mm
- 50 mm

33. The first stage of natural process of sludge digestion is

- acid fermentation
- acid regression
- alkaline fermentation
- None of these

34. In moment distribution method, the sum of distribution factors of all the members meeting at any joint is always

- zero
- 1
- less than 1
- greater than 1

35. In which of the following directions the strength of timber is maximum?

- (A) Parallel to grains
- (B) 45° to the grains
- (C) Perpendicular to the grains
- (D) Same in all directions

36. The Sp. Gravity of sewage is

- (A) equal to 1.
- (B) slightly less than 1.
- (C) much greater than 1.
- (D) slightly greater than 1.

37. The effective length of a steel column effectively held in position at both ends and restraint in rotation at one end is

- (A) 0.85 actual length
- (B) 0.8 actual length
- (C) 0.65 actual length
- (D) 0.60 actual length

38. Sewer ventilating columns are generally placed at

- (A) distances 150m to 300m.
- (B) upper ends of branch sewers.
- (C) every change in the size of sewer.
- (D) All of the above

39. The ratio of torsional moments of resistance of a solid circular shaft of dia 'D' and a hollow shaft having external dia 'D' and internal dia 'd' is

- (A) $\frac{D^4}{(D^4 - d^4)}$
- (B) $\frac{(D^4 - d^4)}{D^4}$
- (C) $\frac{D^3}{(D^4 - d^4)}$
- (D) $\frac{(D^4 - d^4)}{D^3}$

40. Shear stress on principal planes is

- (A) Zero
- (B) Maximum
- (C) Minimum
- (D) None of the above

41. A triangular beam section having base width 'b' and height 'd' the section modulus for beam strength is

- (A) $\frac{bd^2}{24}$
- (B) $\frac{bd^2}{36}$
- (C) $\frac{bd^2}{12}$
- (D) $\frac{bd^2}{6}$

42. A propped cantilever beam of span 'l' carries udl of 'w' per unit over the entire span. The value of prop reaction to keep the beam horizontal is

- (A) $\frac{wl}{2}$
- (B) $\frac{wl}{3}$
- (C) $\frac{3}{8}wl$
- (D) $\frac{5}{8}wl$

43. The chemically precipitated sedimentary rock is

- (A) Granite
- (B) Gypsum
- (C) Quartzite
- (D) Marble

44. The main reason for providing number of reinforcing bars at the support of a simply supported beam is to resist in that zone —

- (A) Tensile stress
- (B) Compressive stress
- (C) Shear stress
- (D) Bond stress

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45. If the Froude's Number of flow in an open channel is more than 1.0, then the flow is said to be
 (A) critical
 (B) shooting
 (C) streaming
 (D) transactional

46. A transition curve when inserted between the tangent and the circular curve
 (A) should meet the original straight tangentially.
 (B) should meet the circular curve tangentially.
 (C) the rate of increase of curvature along the transition curve should be same as that of increase of super-elevation.
 (D) All of the above

47. Which of the following is taken into consideration for computing traffic capacity per lane of the highway?
 (A) Passenger cars and light vehicles
 (B) Trucks and buses
 (C) Two-wheelers
 (D) Equivalent of passenger cars

48. Increase in the fineness modulus of aggregates indicates
 (A) Gap grading
 (B) Finer grading
 (C) Coarser grading
 (D) None of these

49. Ratio of instantaneous elongation and stress produced in a bar subjected to suddenly applied load and that produced by the same load applied gradually is
 (A) 4
 (B) 3
 (C) 2
 (D) $\frac{1}{2}$

50. The water content of a saturated soil sample having void ratio 1.3 and sp.gr. 2.6 is
 (A) 50%
 (B) 25%
 (C) 5%
 (D) 0.5%

51. For the upstream face of an earthen dam, the most adverse condition for stability of slope is
 (A) sudden draw down
 (B) steady seepage
 (C) during construction
 (D) sloughing of slope

52. The bearing capacity of soil is influenced by the foundation with its
 (A) shape
 (B) type
 (C) depth below the ground
 (D) All of the above

53. A RCC slab is 75mm thick. The maximum size of reinforcement bar that can be used is
 (A) 12 mm diameter
 (B) 10 mm diameter
 (C) 8 mm diameter
 (D) 6 mm diameter

54. Moment area method is applied to determine
 (A) SF and BM at a point.
 (B) slope and deflection at a point.
 (C) only deflection at a point.
 (D) bending stress and shear stress at a point.

55. For no tension on a circular section column of dia 'd' the eccentricity should not exceed
 (A) $\frac{d}{6}$
 (B) $\frac{d}{8}$
 (C) $\frac{d}{4}$
 (D) $\frac{d}{3}$

56. Increase in fineness modulus of aggregate indicates

- (A) Finer grading
- (B) Coarse grading
- (C) Gap grading
- (D) None of the above

57. The action of negative skin friction on the pile is to

- (A) increase the ultimate load on the pile.
- (B) reduce the allowable load on the pile.
- (C) maintain the working load on the pile.
- (D) reduce the settlement of the pile.

58. To observe an included angle with better accuracy by reading the verniers of a theodolite, the method preferred is

- (A) reiteration
- (B) repetition
- (C) double observation
- (D) All of these

59. The depth of water required to bring the soil moisture content of a given soil upto its field capacity is called

- (A) Hygroscopic water
- (B) Equivalent moisture
- (C) Soil moisture deficiency
- (D) Pellicular water

60. _____ apparatus is used to test liquid limit of a soil.

- (A) Mohr
- (B) Casagrande
- (C) Otto
- (D) Terzaghi

61. The characteristics of fresh and septic sewage respectively are

- (A) acidic and alkaline
- (B) alkaline and acidic
- (C) both acidic
- (D) both alkaline

62. Aeration of water is done for removal of

- (A) Turbidity
- (B) Colour
- (C) Odour
- (D) Hardness

63. The moment required to rotate the near end of a prismatic beam through a unit angle without translation, the far end being simply supported, is given by

- (A) $\frac{3EI}{L}$
- (B) $\frac{4EI}{L}$
- (C) $\frac{2EI}{L}$
- (D) $\frac{EI}{L}$

64. The unit weight of a soil at zero air voids depends on

- (A) specific gravity
- (B) water content
- (C) unit weight of water
- (D) All of the above

65. The natural water content of the soil sample was found to be 40%, specific gravity is 2.7 and void ratio 1.2; then the degree of saturation of the soil will be

- (A) 100%
- (B) 69%
- (C) 87%
- (D) 90%

66. Profile levelling is usually done for determining

- (A) contour of an area.
- (B) capacity of a reservoir.
- (C) elevation along straight line.
- (D) boundary of a property.

67. A steel beam section is classed as low shear case when the factored shear force is less than

- (A) V_d
- (B) $0.4V_d$
- (C) $0.6V_d$
- (D) $0.8V_d$

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68. Shrinkage in concrete increases with
 (A) increase in water cement ratio.
 (B) increase in cement content.
 (C) decrease in humidity.
 (D) All of these

69. The most commonly used damp proofing material is
 (A) Bitumen
 (B) Cement concrete
 (C) Paraffin wax
 (D) Cement solution

70. 'pH' value of sludge during alkaline regression stage is
 (A) more than 7
 (B) less than 7
 (C) equal to 7
 (D) None of these

71. A rectangular channel section will be most economical when the depth of flow and bottom width are in the ratio of
 (A) 1 : 4
 (B) 1 : 1
 (C) 1 : 2
 (D) 2 : 1

72. 1 atm. pressure is equivalent to
 (A) 1.315 kgf/cm²
 (B) 1000 Newtons
 (C) 760 mm Hg
 (D) 14.7 Pascals

73. The strength of concrete increases with
 (A) increase in water-cement ratio.
 (B) increase in fineness of cement.
 (C) decrease in curing time.
 (D) decrease in size of aggregate.

74. The section modulus of a beam of square section of each side 'b' placed with a diagonal horizontally is

(A) $\frac{b^3}{6}$
 (B) $\frac{b^3}{3\sqrt{2}}$
 (C) $\frac{b^3}{4\sqrt{2}}$
 (D) $\frac{b^3}{6\sqrt{2}}$

75. In a particular material, if the modulus of rigidity is equal to the bulk modulus then the Poisson's ratio will be

(A) 1
 (B) $\frac{1}{2}$
 (C) $\frac{1}{4}$
 (D) $\frac{1}{8}$

76. The coagulant widely used for sewage treatment is

(A) alum
 (B) ferric chloride
 (C) ferric sulphate
 (D) chlorinated copperas

77. In order to obtain the best workability of concrete the perfect shape of aggregate is

(A) rounded
 (B) elongated
 (C) angular
 (D) All of these

78. The range of Baylis turbidimeter is

(A) 0-2 ppm
 (B) 0-50 ppm
 (C) 0-500 ppm
 (D) 0-1000 ppm

79. In a tube-well the yield will
 (A) increase with higher draw down.
 (B) decrease with higher draw down.
 (C) not depend on draw down.
 (D) maximum at zero draw down.

80. Moment of resistance of a 'T' beam is greater due to large
 (A) amount of tensile steel.
 (B) amount of compression steel.
 (C) compressive area of flange.
 (D) None of these

81. Timber is a material which is
 (A) Isotropic
 (B) Anisotropic
 (C) Ductile
 (D) Malleable

82. Los Angeles testing machine is used to conduct
 (A) attrition test
 (B) impact test
 (C) abrasion test
 (D) crushing strength test

83. The kinetic energy of a body of mass ' m ' and velocity ' v ' is equal to
 (A) mv^2
 (B) $\frac{mv}{2}$
 (C) $\frac{m^2v}{2}$
 (D) $\frac{mv^2}{2}$

84. Which of the following errors is more severe in plane table surveying?
 (A) Defective orientation
 (B) Defective sighting
 (C) Non-horizontality of board when points sighted are at large differences of their elevations
 (D) Movement of board between sights

85. For carrying out bituminous patch work during the rainy season, the most suitable binder is
 (A) Road tar
 (B) Hot bitumen
 (C) Cutback bitumen
 (D) Bituminous emulsion

86. A rigidly fixed beam of span ' l ' carries udl of ' w ' per unit, the fixed end moment is
 (A) $\frac{wl^2}{8}$
 (B) $\frac{wl^2}{10}$
 (C) $\frac{wl^2}{12}$
 (D) $\frac{wl^2}{16}$

87. The ratio of maximum compressive stress and maximum tensile stress at base of a circular column of diameter ' d ' with an eccentricity $\frac{d}{4}$ is
 (A) 3
 (B) 4
 (C) 5
 (D) None of these

88. Which one of the following tests is performed in the laboratory to determine the extent of weathering of aggregates for roadworks?
 (A) Soundness test
 (B) Crushing test
 (C) Impact test
 (D) Abrasion test

89. When the water surface coincides with the top edge of a rectangular vertical plate 40m (wide) \times 3m (deep), then the depth of centre of pressure is
 (A) 1m
 (B) 1.5m
 (C) 2m
 (D) 2.5m

Please Turn Over

90. In open channel water flows under
 (A) force of gravity
 (B) atmospheric pressure
 (C) hydrostatic pressure
 (D) mechanical pressure

91. Shrouding is provided in case of
 (A) slotted type wells
 (B) strainer wells
 (C) cavity wells
 (D) All of the above

92. The transitional property of a lemniscates curve is disrupted when its deflection angle is around
 (A) 30°
 (B) 45°
 (C) 60°
 (D) 90°

93. If width and depth of a beam section is increased the bending stress will
 (A) increase
 (B) decrease
 (C) remain unchanged
 (D) None of these

94. Oxidation process results in the formation of
 (A) Carbon dioxide
 (B) Nitrates
 (C) Sulphates
 (D) All of the above

95. During sewage treatment, effluent from which one of the following treatment units has minimum wt/vol amount of suspended solids?
 (A) Detritus channel
 (B) Primary sedimentation tank
 (C) Secondary sedimentation tank
 (D) Activated sludge process aeration tank

96. Shear reinforcement is provided to resist
 (A) diagonal bending
 (B) diagonal tension
 (C) diagonal compression
 (D) None of these

97. A hollow circular section having 8 cm outer dia and 6 cm inner dia, the radius of gyration will be
 (A) 1.5 cm
 (B) 2.0 cm
 (C) 2.5 cm
 (D) 3 cm

98. Methemoglobinemia disease in infants is caused due to
 (A) Chlorides
 (B) Sulphides
 (C) Nitrates
 (D) All of these

99. The moisture content in a well seasoned timber is
 (A) 4% to 6%
 (B) 10% to 12%
 (C) 15% to 20%
 (D) 100%

100. Excess alkalies in cement cause
 (A) alkali aggregate reaction
 (B) efflorescence
 (C) staining
 (D) All of these