

**M.E. Civil Engg. (Construction Technology &
Management)**

1. If the volume of voids is equal to the volume of solids in a soil mass, then the values of porosity and voids ratio respectively are
 - A) 1.0 and 0.0
 - B) 0.0 and 1.0
 - C) 0.5 and 1.0
 - D) 1.0 and 0.5

2. In hydrometer analysis for a soil mass
 - A) Both meniscus correction and dispersing agent correction are additive
 - B) Both meniscus correction and dispersing agent correction are subtractive
 - C) Meniscus correction is additive and dispersing agent correction is subtractive
 - D) Meniscus correction is subtractive and dispersing agent correction is additive

3. When the plastic limit of a soil is greater than the liquid limit, then the plasticity index is reported as
 - A) Negative
 - B) zero
 - C) Non-plastic (NP)
 - D) One

4. The hydraulic head that would produce a quick condition in a sand stratum of thickness 1.5 m, specific gravity 2.67 and voids ratio 0.67 is equal to
 - A) 1.0m
 - B) 1.5 m
 - C) 2.0 m
 - D) 3m

5. The slope of isochrone at any point at a given time indicates the rate of change of
 - A) Effective stress with time
 - B) Effective stress with depth
 - C) Pore water pressure with depth
 - D) Pore water pressure with time

6. The slenderness ratio of a column supported throughout its length by a masonry wall is
- A) zero
- B) 10
- C) 100
- D) Infinity
7. Select the incorrect statement
- A) Effective cohesion of a soil can never have a negative value.
- B) Effective angle of internal friction for coarse grained soils is rarely below 30° .
- C) Effective angle of internal friction for a soil increases as state of compact-ness increases.
- D) Effective angle of internal friction is a complicated function of mineralogy and clay size content.
8. For supplying water to rabi crop, kharif crop and sugarcane, the channel is designed for a capacity equal to the greater of the water requirement of
- A) Rabi or kharif
- B) Rabi and kharif or sugarcane
- C) Rabi and sugarcane or kharif and sugarcane
- D) Rabi or kharif or sugarcane
9. A simply supported beam A carries a point load at its mid span. Another identical beam B carries the same load but uniformly distributed over the entire span. The ratio of the maximum deflections of the beams A and B, will be
- A) $2/3$
- B) $3/2$
- C) $5/8$
- D) $8/5$
10. The ratio of crippling loads of a column having both the ends fixed to the column having both the ends hinged, is
- A) 1
- B) 2
- C) 3
- D) 4
11. If a solid shaft (diameter 20 cm, length 400 cm, $N = 0.8 \times 10^5$ N/mm²) when subjected to a twisting moment, produces maximum shear stress of 50 N/mm², the angle of twist in radians, is
- A) 0.001
- B) 0.002

- C) 0.0025
- D) 0.003

12. Infiltration rate is always
- A) more than the infiltration capacity
 - B) less than the infiltration capacity
 - C) equal to or less than the infiltration capacity
 - D) equal to or more than the infiltration capacity
13. Lacing bars in a steel column should be designed to resist
- A) bending moment due to 2.5% of the column load
 - B) shear force due to 2.5% of the column load
 - C) 2.5% of the column load
 - D) Both (A) and (B)
14. If d is the depth of the aquifer through which water is flowing, then the relationship between permeability k and transmissibility T is given by
- A) $T = kd$
 - B) $T = k/d$
 - C) $T = Vkd$
 - D) $k = VTd$
15. If the ratio of the span to the overall depth does not exceed 10, the stiffness of the beam will ordinarily be satisfactory in case of a
- A) Simply supported beam
 - B) Continuous beam
 - C) Cantilever beam
 - D) Fixed Beam
16. For M 150 grade concrete (1:2:4) the moment of resistance factor is
- A) 0.87
 - B) 8.50
 - C) 7.50
 - D) 5.80
17. In the zone of R.C.C. beam where shear stress is less than 5 kg/cm^2 , nominal reinforcement is provided at a pitch of
- A) One-half lever arm of the section
 - B) One-third lever arm of the section
 - C) Lever arm of the section
 - D) One and half lever arm of the section

18. Spacing of stirrups in a rectangular beam, is
- A) Kept constant throughout the length
 - B) Decreased towards the centre of the beam
 - C) Increased at the ends
 - D) Increased at the centre of the beam
19. By over-reinforcing a beam, the moment of resistance can be increased not more than
- A) 10 %
 - B) 15 %
 - C) 20 %
 - D) 25 %
20. The diameter of transverse reinforcement of columns should be equal to one-fourth of the diameter of the main steel rods but not less than
- A) 4 mm
 - B) 5 mm
 - C) 6 mm
 - D) 7 mm
21. Turbidity is measured on
- A) Standard silica scale
 - B) Standard cobalt scale
 - C) Standard platinum scale
 - D) Platinum cobalt scale
22. The length of lap in tension reinforcement should not be less than the bar diameter $\times$ (actual tension / four times the permissible average bond stress) if it is more than
- A) 18 bar diameters
 - B) 24 bar diameters
 - C) 30 bar diameters
 - D) 36 bar diameters
23. Based on punching shear consideration, the overall depth of a combined footing under a column A, is
- A) $(\text{Area of the column A} \times \text{Safe punching stress}) / \text{Load on column A}$
 - B) $(\text{Perimeter of column A} \times \text{Safe punching stress}) / (\text{Load on column A} + \text{Upward pressure} \times \text{Area of the column})$
 - C) $(\text{Perimeter of column A} \times \text{Safe punching stress}) / (\text{Load on column A} \times \text{Upward pressure} \times \text{Area of the column})$
 - D) None of these
24. Trap efficiency of a reservoir is a function of

- A) Capacity/inflow ratio
 - B) Capacity/outflow ratio
 - C) Outflow/inflow ratio
 - D) None of the above
- 25.** The width of the flange of a T-beam should be less than
- A) One- third of the effective span of the T -beam
 - B) Distance between the centres of T-beam
 - C) Breadth of the rib plus twelve times the thickness of the slab
 - D) Least of the above
- 26.** The amount of reinforcement for main bars in a slab, is based upon
- A) Minimum bending moment
 - B) Maximum bending moment
 - C) Maximum shear force
 - D) Minimum shear force
- 27.** The desirable length of overtaking zone as per IRC recommendation is equal to
- A) Overtaking sight distance
 - B) Two times the overtaking sight distance
 - C) Three times the overtaking sight distance
 - D) Five times the overtaking sight distance
- 28.** If b is the wheel track of a vehicle and h is the height of centre of gravity above road surface, then to avoid overturning and lateral skidding on a horizontal curve, the centrifugal ratio should always be
- A) Less than $b/2h$ and greater than co-efficient of lateral friction
 - B) Less than $b/2h$ and also less than co-efficient of lateral friction
 - C) Greater than $b/2h$ and less than co-efficient of lateral friction
 - D) Greater than $b/2h$ and also greater than coefficient of lateral friction
- 29.** The absolute minimum radius of curve for safe operation for a speed of 110 kmph
- A) 110 m
 - B) 220 m
 - C) 440 m
 - D) 577 m
- 30.** The transition curve used in the horizontal alignment of highways as per IRC recommendations is
- A) Spiral
 - B) Lemniscate
 - C) Cubic parabola
 - D) Any of the above
- 31.** The percentage compensation in gradient for ruling gradient of 4%

and horizontal curve of radius 760 m is

- A) 0.1 %
- B) 1 %
- C) 10%
- D) No compensation

32. If an ascending gradient of 1 in 50 meets a descending gradient of 1 in 50, the length of summit curve for a stopping sight distance of 80 m will be

- A) Zero
- B) 64m
- C) 80m
- D) 60m

33. Which of the following is known as design capacity?

- A) Basic capacity
- B) Theoretical capacity
- C) Possible capacity
- D) Practical

34. The percentage of filtered water, which is used for back washing in rapid sand filter is about

- A) 0.2 to 0.4
- B) 0.4 to 1.0
- C) 2 to 4
- D) 5 to 7

35. As compared to ordinary portland cement, high alumina cement has

- A) Higher initial setting time but lower final setting time
- B) Lower initial setting time but higher final setting time
- C) Higher initial and final setting times
- D) Lower initial and final setting times

36. The factor of safety for

- A) Steel and concrete are same
- B) Steel is lower than that for concrete
- C) Steel is higher than that for concrete
- D) Cannot be compared

37. Select the correct statement

- A) Material cost of a rivet is higher than that of a bolt.
- B) Tensile strength of a bolt is lesser than that of a rivet.
- C) Bolts are used as a temporary fastenings whereas rivets are used as permanent fastenings.
- D) Riveting is less noisy than bolting.

- 38.** For a continuous slab of 3 m x 3.5 m size, the minimum overall depth of slab to satisfy vertical deflection limits is
- A) 50 mm
 - B) 75 mm
 - C) 100 mm
 - D) 120 mm
- 39.** The percentage of reinforcement in case of slabs, when high strength deformed bars are used is not less than
- A) 0.15
 - B) 0.12
 - C) 0.30
 - D) 1.00
- 40.** For satisfactory working of a sludge digestion unit, the pH range of digested sludge should be maintained as
- A) 4.5 to 6.0
 - B) 6.5 to 8.0
 - C) 8.5 to 10.0
 - D) 10.5 to 12.0
- 41.** The diameter of ties in a column should be
- A) More than or equal to one fourth of diameter of main bar
 - B) More than or equal to 5 mm
 - C) More than 5 mm but less than one-fourth of diameter of main bar
 - D) More than 5 mm and also more than one-fourth of diameter of main bar
- 42.** The main reinforcement in the toe of a T- shaped R C. Retaining wall is provided on
- i) Top face parallel to the wall
 - ii) Top face perpendicular to the wall
 - iii) Bottom face parallel to the wall
 - iv) Bottom face perpendicular to the wall

The correct answer is

- A) only (ii) is correct
 - B) (i) and (ii) are correct
 - C) (iii) and (iv) are correct
 - D) only (iv) is correct
- 43.** In a counterfort retaining wall, the main reinforcement in the stem at mid span is provided on
- A) front face only
 - B) inner face only
 - C) both front face and inner face
 - D) from the toe

44. Assertion A : The load factor for live load is greater than that for dead load.

Reason R : The live loads are more uncertain than dead loads.

Select your answer based on the coding system given below :

- A) Both A and R are true and R is the correct explanation of A.
- B) Both A and R are true but R is not the correct explanation of A.
- C) A is true but R is false.
- D) A is false but R is true.

45. Shrinkage of concrete depends upon

i) humidity of atmosphere

ii) passage of time

iii) stress The correct answer is

- A) (i) and (ii)
- B) (ii) and (iii)
- C) only (iii)
- D) All (i), (ii) and (iii)

46. High carbon content in the steel causes

- A) Decrease in tensile strength but increase in ductility
- B) Increase in tensile strength but decrease in ductility
- C) Decrease in both tensile strength and ductility
- D) Increase in both tensile strength and ductility

47. Cube strength of controlled concrete to be used for pretensioned and post-tensioned work respectively should not be less than

- A) 35 MPa and 42 MPa
- B) 42 MPa and 35 MPa
- C) 42 MPa and 53 MPa
- D) 53 MPa and 42 MPa

48. Which of the following losses of prestress occurs only in pretensioning and not in post-tensioning?

- A) Elastic shortening of concrete
- B) Shrinkage of concrete
- C) Creep of concrete
- D) Loss due to friction

49. In a ring beam subjected to uniformly distributed load

i) shear force at mid span is zero

ii) shear force at mid span is maximum

iii) torsion at mid span is zero

iv) torsion at mid span is maximum The correct answer is

- A) (i) and (iii)
- B) (i) and (iv)
- C) (ii) and (iii)

D) (ii) and (iv)

50. The maximum tolerance in a 20 m chain is

- A) ± 2 mm
- B) ± 3 mm
- C) ± 5 mm
- D) ± 8 mm

51. In the quadrantal bearing system, a whole circle bearing of $293^\circ 30'$ can be expressed as

- A) $W23^\circ 30'N$
- B) $N66^\circ 30'W$
- C) $S113^\circ 30'N$
- D) $N23^\circ 30'W$

52. Size of a theodolite is specified by

- A) The length of telescope
- B) The diameter of vertical circle
- C) The diameter of lower plate
- D) The diameter of upper plate

53. A telescope is said to be inverted if its

- A) Vertical circle is to its right and the bubble of the telescope is down
- B) Vertical circle is to its right and the bubble of the telescope is up
- C) Vertical circle is to its left and the bubble of the telescope is down
- D) Vertical circle is to its left and the bubble of the telescope is up

54. If a tripod settles in the interval that elapses between taking a back sight reading and the following foresight reading, then the elevation of turning point will

- A) Increase
- B) Decrease
- C) Not change
- D) Both A and B

55. If the R.L. of a B.M. is 100.00 m, the back-sight is 1.215 m and the foresight is 1.870 m, the R.L. of the forward station is

- A) 99.345 m
- B) 100.345 m
- C) 100.655m
- D) 101.870m

56. Which of the following methods of con-touring is most suitable for a hilly terrain?

- A) Direct method
- B) Square method
- C) Cross-sections method
- D) Tacheometric method

57. Bowditch rule is applied to
- A) An open traverse for graphical adjustment
 - B) A closed traverse for adjustment of closing error
 - C) Determine the effect of local attraction
 - D) To measure the true bearing
58. For a tacheometer the additive and multi-plying constants are respectively
- A) 0 and 100
 - B) 100 and 0
 - C) 0 and 0
 - D) 100 and 100
59. When a liquid rotates at a constant angular velocity about a vertical axis as a rigid body, the pressure intensity varies
- A) Linearly with radial distance
 - B) As the square of the radial distance
 - C) Inversely as the square of the radial distance
 - D) Inversely as the radial distance
60. If the velocity is zero over half of the cross-sectional area and is uniform over the remaining half, then the momentum correction factor is
- A) 1
 - B) $4/3$
 - C) 2
 - D) 4
61. In a forced vortex motion, the velocity of flow is
- A) Directly proportional to its radial distance from axis of rotation
 - B) Inversely proportional to its radial distance from the axis of rotation
 - C) Inversely proportional to the square of its radial distance from the axis of rotation
 - D) Directly proportional to the square of its radial distance from the axis of rotation
62. Coefficient of velocity for Borda's mouth piece running full is
- A) 0.611
 - B) 0.707
 - C) 0.855
 - D) 1.00
63. The discharge over a broad crested weir is maximum when the depth of flow is
- A) $H/3$
 - B) $H/2$
 - C) $2H/5$
 - D) $2H/3$
- Where H is the available head.

64. Which of the following statements is correct?
- A) Lower critical Reynolds number is of no practical significance in pipe flow problems.
 - B) Upper critical Reynolds number is significant in pipe flow problems.
 - C) Lower critical Reynolds number has the value 2000 in pipe flow
 - D) Upper critical Reynolds number is the number at which turbulent flow changes to laminar flow.
65. Stanton diagram is a
- A) Log-log plot of friction factor against Reynolds number
 - B) Log-log plot of relative roughness against Reynolds number
 - C) Semi-log plot of friction factor against Reynolds number
 - D) Semi-log plot of friction factor against relative roughness
66. For hydro-dynamically smooth boundary, the friction coefficient for turbulent flow is
- A) Constant
 - B) Dependent only on Reynolds number
 - C) A function of Reynolds number and relative roughness
 - D) Dependent on relative roughness only
67. The process of lagooning is primarily a means of
- A) Reducing the excessive flow in sewers
 - B) Disposing of sludge
 - C) Increasing the capacity of storage re-servoirs
 - D) Increasing flow of sewage through imhoff tanks
68. In PERT analysis, the time estimates of activities and probability of their occurrence follow
- A) Normal distribution curve
 - B) Poisson's distribution curve
 - C) Beta distribution curve
 - D) Parabolic curve
69. If the optimistic time, most likely time and pessimistic time for activity A are 4, 6 and 8 respectively and for activity B are 5, 5.5 and 9 respectively, then
- A) Expected time of activity A is greater than the expected time of activity B
 - B) Expected time of activity B is greater than the expected time of activity A
 - C) Expected time of both activities A and B are same
 - D) Not related to each other
70. The constraints in case of resource smoothening operation would be
- A) Resources

- B) Project duration time
- C) Both resources and project duration time
- D) Critical time

71. Interfering float is the difference between

- A) Total float and free float
- B) Total float and independent float
- C) Free float and independent float
- D) Free float and slack

72. Chlorine demand of water is equal to

- A) Applied chlorine
- B) Residual chlorine
- C) Sum of applied and residual chlorine
- D) Difference of applied and residual chlorine

73. The method of analysis of distribution system in which the domestic supply is neglected and fire demand is considered is

- A) Circle method
- B) Equivalent pipe method
- C) Electrical analysis method
- D) Hardy cross method

74. The self cleansing velocity for all sewers in India is usually

- A) Less than 1.0 m/sec
- B) 1.0 m/sec to 1.2 m/sec
- C) 1.5 m/sec to 2.0 m/sec
- D) 3.0 m/sec to 3.5 m/sec

75. The correct relation between theoretical oxygen demand (TOD), Biochemical oxygen demand (BOD) and Chemical oxygen demand (COD) is given by

- A) $TOD > BOD > COD$
- B) $TOD > COD > BOD$
- C) $BOD > COD > TOD$
- D) $COD > BOD > TOD$