010/2020

1. For a given material if 'E', 'N', and μ are the Youngs modulus, Modulus of rigidity and Poisson's ratio respectively, then which of the following is correct :
   (A) $E = 2N(1-\mu)$ (B) $E = 2N(1+\mu)$
   (C) $N = 2E(1-\mu)$ (D) $E = 2N/(1-\mu)$

2. A simply supported beam of span 'L' units is subjected to two concentrated loads of 'W' kN acting at 'L/4' from both ends. The shear force at the mid point of the beam will be :
   (A) W   (B) W/2
   (C) 2 W   (D) 0

3. A 'T' section is used as simply supported beam, it is subjected to a uniformly distributed load throughout the span. The maximum bending stress will occur at :
   (A) Top of the section
   (B) Centre of gravity of the section
   (C) Bottom of section
   (D) At the junction between flange and the web of the section

4. A cantilever beam of span 'L' units is subjected to a concentrated load of 'W' kN at the free end. The cross section of the beam is rectangular with breadth 'b' units and depth 'd' units. If the modulus of elasticity of the beam material is 'E', the ratio of maximum deflection to maximum bending stress is :
   (A) $2L^2/3Ed$ (B) $L^2/6Ed$
   (C) $L^2/4Ed$ (D) $L^2/48Ed$

5. If the value of Euler crippling load of a column with both ends hinged is 100 kN, what will be the value of Euler crippling load of another column made with the same material, equal cross section and length but with both ends fixed :
   (A) 100 kN   (B) 400 kN
   (C) 200 kN   (D) 25 kN

6. For a perfect truss having 'm' members and 'j' joints. Which of the following relationship is correct :
   (A) $m = 2j - 3$ (B) $m = 2j + 3$
   (C) $m = j + 3$ (D) $m < 2j - 3$

A

3

7. For a parabolic three hinged arch subjected to a uniformly distributed load of intensity 'w' kN per unit horizontal length. The span of the arch is 'L' units and the central rise 'h/2' units. The horizontal thrust (H) of the arch is :

    (A) $H = wL^2/4h$ (B) $H = wL^2/8h$

    (C) $H = wL^2/16h$ (D) $H = wL^2/2h$

8. When a uniformly distributed load shorter than the span is traversing a simply supported beam. At any point in the beam, maximum value of bending moment will occur when the load is :

    (A) Equally placed about the point

    (B) When the point divides the load in the same ratio as it divides the span

    (C) When the load is centrally placed

    (D) When the tail end of the load is at the left end of the beam

9. If the moment 'M' is applied to the hinged end of a prismatic propped cantilever beam then the moment at the fixed end of the beam will be :

    (A) M   (B) M/2

    (C) 2 M   (D) –M/2

10. The relationship between distribution factor used in moment distribution method (dj) and rotation factor (rj) used in Kani's method is :

    (A) $rj = -dj/2$ (B) $rj = dj$

    (C) $rj = 2dj$ (D) $rj = -1.5dj$

11. The ratio of radiation reflected back by a surface to the radiation received by it is called its :

    (A) Radiation coefficient   (B) Absorption coefficient

    (C) Albedo   (D) Bowen's ratio

12. A pipe 0.15 m dia taking off from a reservoir suddenly expands to 0.3 m at the end of 16 m and continues for another 15 m. If the head above the inlet of the pipe is 4.88 m, the actual velocity at the exit, taking into considerates all the lossess is, (Assume $f = 0.04$ for the complete pipe line) :

    (A) 1.07 m/s   (B) 0.039 m/s

    (C) 0.99 m/s   (D) 1.22 m/s

13. Removal of soil from rivulets by concentrated overland flow is known as :

    (A) sheet erosion   (B) channel erosion

    (C) rill erosion   (D) gully erosion

14. The discharge through a triangular notch under a constant head of 0.25 m if the angle of the notch is 120° and Cd, 0.62 is :
    (A) 0.132 m³/S
    (B) 0.006 m³/S
    (C) 0.079 m³/S
    (D) 0.316 m³/S

15. A reservoir has an area of $8.5 \times 10^4 m^2$ and is provided with a weir 4.5 m long. How long will it take for the level at the sill to fall from 0.6 m to 0.3 m :
    (A) 6.91 hrs.
    (B) 3.112 hrs.
    (C) 10.37 hrs.
    (D) 2.305 hrs.

16. For natural stream channels, the value of Muskingum parameter will generally :
    (A) between 0 and 0.3
    (B) between 0.3 and 0.6
    (C) more than 0.5
    (D) more than 1.0

17. A small lead sphere of specific gravity 11.5 has a terminal fall velocity of 7 mm/S in a fluid of specific gravity 1.25 and dynamic viscosity 7.848 poise :
    (A) 1 mm
    (B) 0.008 mm
    (C) 1.428 mm
    (D) 0.0183 mm

18. The volume of water stored between normal reservoir level and maximum reservoir level is
    (A) surcharge storage
    (B) live storage
    (C) bank storage
    (D) useful storage

19. A single acting reciprocating pump has a plunger dia 0.3 m and a stroke length 0.4 m. If the speed of the pump is 60 rpm and Cd is 0.97, actual discharge of the pump is :
    (A) 6.8575 l/s
    (B) 27.43 l/s
    (C) 9.143 l/s
    (D) 30.48 l/s

20. The rating curve of a stream gauging station gives the variation of discharge :
    (A) the area of the flow
    (B) the stage
    (C) the velocity of flow
    (D) the depth of flow

21. The length of a line measured by a 30 m chain was found to be 504.4 m. It was afterwards found that the chain was 0.05 m too long, then the true length of the line is :
    (A) 505.04 m
    (B) 505.14 m
    (C) 505.24 m
    (D) 505.34 m

22. A 50 m tape is held 2.5 m out of line. What is the true length?
    (A) 49.74
    (B) 49.84
    (C) 49.94
    (D) 50.04

23. The following perpendicular offsets were taken at 10 m intervals from a survey line to an irregular shaped boundary line : 2.52, 4.56, 6.82, 2.82, 5.89, 4.82, 8.27, 7.12 and 5.91 (All measured in metres). Calculate the are a (in m²) enclosed between the survey line and the irregular shaped boundary line by Simpson's Rule :
    (A) 405.6 m²   (B) 415.6 m²
    (C) 425.6 m²   (D) 435.6 m²

24. Choose the oddman out from the following :
    (A) Radiation method   (B) Two point problem
    (C) Three point problem   (D) Height of collimation method

25. If the distance between two points is 20 km, then the combined correction due to curvature and refraction (in metres) is :
    (A) 6.92   (B) 16.92
    (C) 26.92   (D) 36.92

26. The value of a property at the end of the utility period without being dismantled is :
    (A) Scrap value   (B) Rateable value
    (C) Salvage value   (D) Market value

27. If C is the original cost, S is the scrap value, $n =$ Life of the property (years), then the Annual depreciation of the property (using declining balance method is given by) :

    (A) $D = \left(1 - \dfrac{S}{C}\right)^n$ (B) $D = \left[1 - \left(\dfrac{S}{C}\right)^{1/n}\right]$

    (C) $D = \left(1 - \dfrac{C}{S}\right)^n$ (D) $D = \left[1 - \left(\dfrac{C}{S}\right)^{1/n}\right]$

28. IS Code 1200 (Methods of measurement of building and Civil engineering works) : Part I deals with :
    (A) Earthwork   (B) Concrete work
    (C) Brick work   (D) Stone Masonry

29. A property fetches a net annual income of Rs. 900/- deducting all outgoings. If the rate of interest is 5% per annum, then the capitalised value of the property is :
    (A) Rs. 16,000/-   (B) Rs. 18,000/-
    (C) Rs. 20,000/-   (D) Rs. 22,000/-

30. In what units are the quantities for the frames of doors and windows computed :
    (A) m   (B) m²
    (C) m³   (D) None of these

31. Grade of Cement refers to :
    (A) Particle size
    (B) Order of grinding
    (C) Soundness
    (D) Compressive strength

32. Seasoning of timber is done to :
    (A) reduce the weight of timber
    (B) reduce the chances of shrinkage
    (C) increase the strength and durability
    (D) all the above

33. In half turn Stairs, change in direction is through :
    (A) 110°
    (B) 180°
    (C) 90°
    (D) 45°

34. Fineness of Cement is measured in units of :
    (A) Volume / Mass
    (B) Mass / Volume
    (C) Area / Mass
    (D) Mass / Area

35. For an activity in a PERT network, if the Optimistic time, Most likely time and Pessimistic time are 5,8 and 17 weeks respectively, the expected time is equal to :
    (A) 8 weeks
    (B) 9 weeks
    (C) 10 weeks
    (D) 15 weeks

36. The most popular type of contract in Government departments is :
    (A) Item rate
    (B) Cost plus percentage
    (C) Lump sum
    (D) Cost plus fixed fee

37. Silica fume is considered as a :
    (A) Chemical admixture
    (B) Mineral admixture
    (C) Colouring admixture
    (D) Cleaning admixture

38. The portion of a wall on which the end of an arch rests is known as :
    (A) Abutment
    (B) Lintel
    (C) Soffit
    (D) Nosing

39. When percentage of mica present in sand is high, it :
    (A) increases the strength of mortar or concrete
    (B) reduces the strength of mortar or concrete
    (C) has no effect on the strength of mortar or concrete
    (D) enhances the strength of mortar or concrete slightly

40. "Crashing" of a project is :
    (A) reduction in project size
    (B) reduction in resource
    (C) reduction in cost
    (D) reduction in duration

41. Which of the following tests is not used for determining the workability of concrete?
- (A) Compacting factor test
- (B) Blaine's test
- (C) Flow test
- (D) Vee-bee consistometer test

42. Identify the statement which is not true. The process of cold working of steel :
- (A) increases the yield strength
- (B) increases the ductility
- (C) decreases the percentage elongation
- (D) results in residual strain

43. The best lateral load resisting structural system for a building of 100 storeys is:
- (A) Rigid frames
- (B) Framed tubes
- (C) Frame-Shear wall dual system
- (D) Diagrid system

44. A moving formwork is called :
- (A) Elevator
- (B) Slipform
- (C) Scaffolding
- (D) Shuttering

45. Which of the following is not true?
- (A) Increasing tricalcium silicate (C_3S) and tricalcium aluminate (C_3A) contribute to high early strength of cement
- (B) Increasing the fineness of cement results in high compressive strength
- (C) Increasing dicalcium silicate (C_2S) retards early development of strength of cement
- (D) Increasing dicalcium silicate (C_2S) generates more heat of hydration

46. Failure of a component or a structure due to several cycles of repeated loads is called :
- (A) Fatigue failure
- (B) Buckling failure
- (C) Brittle fracture
- (D) Flexural failure

47. Select the most appropriate combination :

E.	Soft storey	P.	Retrofitting technique
F.	Shear wall	Q.	Vulnerable to earthquake
G.	Jacketing	R.	Provides large column-free space in the lower storey
H.	Transfer girder	S.	Lateral load resisting system

- (A) E-R, F-Q, G-P, H-S
- (B) E-S, F-Q, G-P, H-R
- (C) E-Q, F-S, G-P, H-R
- (D) E-Q, F-P, G-S, H-R

48. The extent of time by which the start of an activity may be delayed without interfering with the start of the succeeding activity is called :
- (A) earliest start time
- (B) latest start time
- (C) free float
- (D) latest finish time

49. Which is not true?
  (A) PERT is used in research and development projects
  (B) PERT is activity oriented
  (C) Project duration estimate using PERT is probabilistic
  (D) PERT is used for projects which are non-repetitive in nature

50. Choose the correct statement :
  (A) The amount deposited by the contractor while submitting the tender is called security deposit
  (B) Earnest Money Deposit (EMD) has to be deposited only by the contractor whose tender is accepted by the client
  (C) If the lowest quoted contractor refuses to take up the work, his EMD will be forfeited by the client
  (D) Security deposit is refunded to the contractor soon after completing the project

51. Which treatment process is carried out after filtration of water?
  (A) Sedimentation   (B) Disinfection
  (C) Coagulation   (D) Flocculation

52. Population forecasting method best suited when the growth rate is having decreasing trend and the city is heading towards saturation :
  (A) Arithmetic   (B) Geometric
  (C) Graphical   (D) Decreased rate of growth

53. Maximum detention period of a clarifier used in water treatment is :
  (A) 3 hr   (B) 1 hr
  (C) 4 hr   (D) 5 hr

54. The characteristic feature of a Centrifugal pump is ————— flow.
  (A) variable   (B) constant
  (C) continuous   (D) uniform

55. Which of the gas is not produced in the sewer?
  (A) H_2S (B) CH_4
  (C) CO_2 (D) HCl

56. The design period for the design of a water supply project is generally taken as :
  (A) less than 10 years   (B) 20-30 years
  (C) 50 years   (D) 100 years

57. The appurtenance which provides access for inspection and permits cleaning of sewer line is known as :
  (A) manhole   (B) inlet
  (C) catch basin   (D) vent pipe

58. Mention the last stage in sludge treatment process :
(A) thickening
(B) dewatering
(C) drying
(D) digestion

59. The organic loading in an activated sludge plant is defined as :
(A) Volume of aeration tank/Mass of BOD per day
(B) Mass of BOD per day/Volume of the aeration tank
(C) Aeration period × Volume of aeration tank
(D) The mass of BOD per day/Volume of secondary clarifier

60. The Air (Prevention and Control of Pollution) Act was enacted in the year :
(A) 1991
(B) 2000
(C) 1974
(D) 1981

61. The maximum area of tension reinforcement in concrete beams shall not exceed :
(A) 0.15%
(B) 2%
(C) 4%
(D) 1.5%

62. Cantilever retaining walls can safely be used for a height not more than :
(A) 4 m
(B) 5 m
(C) 6 m
(D) 8 m

63. Prestressloss due to friction occurs:
(A) Only in post-tensioned beams
(B) Only in pre-tensioned beams
(C) In both post-tensioned and pre-tensioned beams
(D) None of above

64. To ensure uniform pressure distribution, the thickness of the foundation, is :
(A) Kept uniform throughout
(B) Increased gradually towards the edge
(C) Decreased gradually towards the edge
(D) Kept zero at the edge

65. The minimum clear cover for R.C.C. columns shall be :
(A) Greater of 40 mm or diameter of bars
(B) Smaller of 40 mm or diameter of bars
(C) Greater of 25 mm or diameter of bars
(D) Smaller of 25 mm or diameter of bars

66. In a simply supported slab, alternate bars are curtailed at :
(A) 1/4th of the span
(B) 1/5th of the span
(C) 1/7th of the span
(D) 1/6th of the span

67. The pitch of the main bars in a simply supported slab, should not exceed its effective depth by :
    (A) Three times   (B) Four times
    (C) Five times   (D) Six times

68. 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

69. Columns may be made of plain concrete if their unsupported length does not exceed their least lateral dimensions :
    (A) 2 times   (B) 3 times
    (C) 4 times   (D) 5 times

70. The maximum ratio of span to depth of a slab simply supported and spanning in one direction, is :
    (A) 35   (B) 25
    (C) 30   (D) 20

71. Compression failure of simply supported beam occurs in :
    (A) Balanced section   (B) Over reinforced section
    (C) Under reinforced section   (D) None of above

72. Limit state of serviceability for deflection including the effects due to creep, shrinkage and temperature occurring after erection of partitions and application of finishes as applicable to floors and roofs is restricted to :
    (A) Span/150   (B) Span/200
    (C) Span/250   (D) Span/350

73. According to IS – 456 2000 maximum spacing of shear reinforcement for concrete beams in no case shall not exceed :
    (A) 250 mm   (B) 300 mm
    (C) 350 mm   (D) 450 mm

74. In the heel slab of a cantilever retaining wall, main reinforcement is provided at :
    (A) Bottom of slab   (B) Top of slab
    (C) Centre of slab   (D) Sides of slab

75. The shrinkage in a concrete slab :
    (A) Causes shear cracks   (B) Causes tension cracks
    (C) Causes compression cracks   (D) Does not cause any cracking

76. In a reinforced concrete retaining wall, a shear key is provided, if the :
   (A) Shear stress in vertical stem is excessive
   (B) Shear force in toe slab is more than heel slab
   (C) Retaining wall is not safe against sliding
   (D) Retaining wall is not safe against overturning

77. The actual thickness of butt weld as compared to the thickness of a plate is usually :
   (A) More   (B) Less
   (C) Equal   (D) None of the above

78. Which one of these defects in timber is due to natural forces?
   (A) Knot   (B) Stain
   (C) Split   (D) Bow

79. In a uniformly distributed loading, aprestressed rectangular beam should be :
   (A) Straight below centroidal axis
   (B) Parabolic with convexity downward
   (C) Parabolic with convexity upward
   (D) Straight above centroidal axis

80. For cylindrical tanks fixed at the base :
   (A) Bending moment and hoop tension are developed
   (B) Only hoop tension will be developed
   (C) Only bending moment will be developed
   (D) None of the above

81. According to Indian Standard Classification soils more than half the coarse fraction which is larger than 75 micron IS Sieve and smaller than 4.75 mm IS Sieve is designated as which of the following?
   (A) Gravels   (B) Sand
   (C) Clay   (D) Silt

82. According to Darcy's Law which of the following is defined as the average velocity of flow that will occur through the total cross sectional area of soil under Unit hydraulic gradient?
   (A) Coefficient of permeability   (B) Coefficient of percolation
   (C) Seepage velocity   (D) Coefficient of transmissibility

83. In which of the following conditions, a clay is said to be pre-consolidated?
   (A) If the present overburden pressure is equal to the existing overburden pressure
   (B) If it has never been subjected to an effective pressure greater than existing overburden pressure
   (C) If it is not fully consolidated under existing overburden pressure
   (D) If it has been subjected to a pressure in excess of its present overburden pressure

84. Which of the following is the circle corresponding to minimum factor of safety against sliding in case of Swedish Circle Method for stability analysis?
     (A) ϕ–circle   (B) Friction circle
     (C) Critical slip circle   (D) Mohr's circle

85. Which among the following assumptions is not correct according to Rankine's Theory for active earth pressure behind a retaining wall?
     (A) The soil mass is semi-infinite, homogenous, dry and cohesionless
     (B) The ground surface is a plane
     (C) Shearing stress between the wall and the soil is taken into account
     (D) The wall yields about the base and thus satisfies the deformation condition for plastic equilibrium

86. Which among the following is called net safe bearing capacity?
     (A) Safe bearing capacity divided by factor of safety
     (B) Net ultimate bearing capacity divided by factor of safety
     (C) Ultimate bearing capacity plus original overburden pressure
     (D) Safe bearing capacity plus original overburden pressure

87. Which procedure is used for getting undisturbed samples from soil?
     (A) Chunk sampling   (B) Standard Penetration test
     (C) Cone Penetration test   (D) Auger boring

88. What is the cause of negative skin friction?
     (A) Pile driving
     (B) Rising of ground water table
     (C) Upward movement of surrounding compressible soil
     (D) Downward movement of surrounding compressible soil

89. Which of the following can be considered as a field test?
     (A) Direct Shear Test   (B) Triaxial Shear Test
     (C) Unconfined Compression Test   (D) Vane Shear Test

90. What for a Proctor needle is used?
     (A) To determine the water content at which the soil is compacted
     (B) To determine optimum moisture content
     (C) To determine zero air voids line
     (D) To determine saturation line

91. The minimum coefficient of lateral friction for a highway is
     (A) 1.0   (B) 0.5
     (C) 0.3   (D) 0.15

92. Grade compensation on curves is a minimum of :
     (A) 55/R   (B) 75/R
     (C) 100/R   (D) 150/R

93. Traffic density is :
- (A) No. of vehicles passing a point in a specific direction in per lane per day
- (B) No. of vehicles passing a point in a specific direction per hour
- (C) Maximum no. of vehicles passing a given point in one hour
- (D) No. of vehicles occupied per unit length of road at an instant

94. The relationship between speed and density is generally :
- (A) Linear
- (B) Parabolic
- (C) No relation
- (D) Asymptotic to both axes

95. FAA recommends that the runway length after having been corrected for elevation and temperature should be further increased at the rate of ———————— for every 1% of effective gradient :
- (A) 10%
- (B) 20%
- (C) 7%
- (D) 15%

96. Sleeper density is :
- (A) No. of sleepers per km length
- (B) No. of sleepers per rail length
- (C) Density of material of sleeper
- (D) Minimum distance between any two adjacent sleepers

97. Negative super elevation in railways arises in case of :
- (A) Main and loop lines
- (B) Transition curves
- (C) Similar flexure
- (D) Contrary flexure

98. Structure constructed in tunneling operations, in advance of the main drivage, along its alignment, to gain information about the ground is called :
- (A) Shaft
- (B) Tunnel invert
- (C) Tunnel soffit
- (D) Pilot tunnel

99. Systems used to prevent damage to ships and berthing structures in the mooring process is called :
- (A) Breakwaters
- (B) Fenders
- (C) Dolphins
- (D) Piers

100. Urbanisation model proposed by E.W. Burgess is :
- (A) Sector Model
- (B) Multiple Nuclei model
- (C) Concentric zone model
- (D) Peripheral model

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SPACE FOR ROUGH WORK

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