



JPSC-AE

CIVIL ENGINEERING

Date : 19th January 2019

Time : 2 : 00 to 4 : 00



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1. A hydraulic jump in a control metre will be formed above the control, if its original
- (a) depth is more than critical depth (b) depth is less than the critical depth
(c) depth is equal to critical depth (d) None of these

Ans. (b)

2. The unit hydrograph theory is based on the assumption of
- (a) non-linear response and time invariance (b) linear response and non-linear time variance
(c) time invariance and linear response (d) non-linear response and non-linear time variance.

Ans. (c)

3. S-hydrograph is used to obtain unit hydrograph of
- (a) shorter duration from longer duration (b) longer duration from shorter duration
(c) both (a) and (b) (d) None of these

Ans. (c)

4. Consumptive use of a crop during growth, is the amount of
- (a) Interception (b) Transpiration (c) Evaporation (d) All of these

Ans. (d)

5. The prism storage in a river reach during the passage of a flood wave is
- (a) A constant (b) A function of inflow and outflow
(c) Function of inflow only (d) Function of outflow only

Ans. (b)

6. Pick up the correct statement from the following:
- (a) Perched aquifer is found in an unconfined aquifer
(b) The top surface of the water held in the perched aquifer is known as perched water table.
(c) Perched aquifer is formed in the unconfined aquifer if an impervious layer exists.
(d) All of these

Ans. (d)

7. The probability of a 10 years flood to occur at least once in the next 4 years is
(a) 25% (b) 35% (c) 50% (d) 65%

Ans. (b)

Probability of happening of flood = $1/10$

Probability of not happening of flood = $1 - 1/10 = 9/10$

Probability of occurrence of flood at least once in 4 years = $1 - 0.9^4 = 0.35 = 35\%$

8. Flocculating agent is added to the raw water in the treatment plant to remove the
(a) floating particles (b) dissolved chemicals
(c) fine suspended particles (d) heavy metals

Ans. (c)

9. The terminal velocity of a settling particle in water medium is calculated using the equation given by
(a) Darcy (b) Stokes (c) Newton (d) Hoffman

Ans. (b)

10. Flowing artesian wells are expected in areas where
(a) the water table is very close to the land surface
(b) the aquifer is confined
(c) the elevation of the piezometric head line is above the elevation of the ground surface
(d) the rainfall is intense

Ans. (a)

11. Standard EDTA solution is used to determine the
(a) turbidity in water (b) dissolved oxygen in water
(c) residual chlorine in water (d) hardness in water

Ans. (d)

12. In which pollution zone of the river, the dissolved oxygen reduced to zero?
(a) Zone of degradation (b) Zone of recovery
(c) Zone of clean water (d) Zone of active decomposition

Ans. (d)

13. Which bacteria results in the corrosion of iron and steel pipes embedded in soil?
- (a) Escherichia coli bacteria (b) Bacterium coli bacteria
(c) Iron bacteria (d) Sulphur bacteria

Ans. (*)

14. The type of valve, which is provided on the suction pipe in the tube-well, is
- (a) air relief valve (b) reflux valve
(c) pressure relief valve (d) None of these

Ans. (b)

15. The filter material used in contact bed is
- (a) Sand (b) Stone ballast
(c) Gravel (d) Fine sand

Ans. (b)

16. Which one of the following parameter is not included in the routine characterization of solid waste for its physical composition?
- (a) Moisture content (b) Density
(c) Particle size analysis (d) Energy value

Ans. (*)

17. Consider the following air pollutants :

1. NO_x 2. PAN 3. CO_2 4. CO

Which of the above air pollutants is/are present in an auto exhaust gas?

- (a) 1 only (b) 1 and 2 (c) 2 and 3 (d) 1, 3 and 4

Ans. (d)

18. The decomposition of sewage takes place, causing a pungent smell. Which of the following causes the pungent smell?
- (a) CO_2 (b) H_2SO_4 (c) HCL (d) H_2S

Ans. (d)



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19. The maximum BOD removal efficiency of an oxidation pond is
(a) 90% (b) 95% (c) 70% (d) 80%

Ans. (a)

20. In the bearing capacity computation the water table effect may be ignored when the water table lies
(a) at the grounded surface (b) at the base of the footing
(c) within the wedge zone (d) below the wedge zone

Ans. (d)

21. What is the critical depth of vertical cut in a saturated cohesive soil with $c = 15.5 \text{ kN/m}^2$ and $\gamma = 18 \text{ kN/m}^3$?
(a) 0.86 m (b) 3.44 m (c) 6.88 m (d) 1.72 m

Ans. (b)

$$\text{Critical depth} = Z = \frac{4c}{\gamma\sqrt{k_a}}$$

For clay, $\phi = 0$ So $k_a = 1$

$$Z = \frac{4 \times 15.5}{18 \times \sqrt{1}} = 3.44$$

22. Which of the following methods of solid waste management conserves energy most efficiently in the form of gas or oil?
(a) Incineration with heat recovery (b) Combusting
(c) Fluidized-bed incineration (d) Pyrolysis

Ans. (d)

23. In urban air pollution, the most poisonous gas is supposed to be carbon monoxide. It is hazardous because it
(a) affects our sense of smell (b) is carcinogenic in nature
(c) combines with haemoglobin (d) causes blindness

Ans. (c)

24. In a saturated soil deposit having a density of 22 kN/m^3 , the effective normal stress on a horizontal at 5.0 m depth, will be
(a) 22 kN/m^2 (b) 60 kN/m^2 (c) 50 kN/m^2 (d) 110 kN/m^2

Ans. (b)

$$\text{Effective stress} = \gamma_{\text{sub}} \times \text{depth}$$

$$\gamma_{\text{sub}} = \gamma_{\text{sat}} - \gamma_w = 22 - 10 = 12 \text{ kN/m}^3$$

$$\bar{\sigma} = \gamma_{\text{sub}} \times \text{depth} = 12 \times 5 = 60 \text{ KPa}$$

25. In an earth dam critical condition for which the stability has to be checked during construction with or without partial pool is/are
- (a) down stream slope (b) upstream slope
(c) Both u/s and d/s slope (d) None of these

Ans. (*)

26. The ultimate bearing capacity of a soil is 310 kN/m², the depth of foundation is 0.80 m and γ is 20 kN/m³. If the F.O.S. is 3, what will be the net safe bearing pressure?
- (a) 98.0 kN/m² (b) 98.86 kN/m² (c) 100.98 kN/m² (d) 100.86 kN/m²

Ans. (a)

$$q_u = 310 \text{ KPa}$$

$$q_{\text{nu}} = q_u - \gamma D_f = 310 - 20 \times 0.8 = 294 \text{ KPa}$$

$$q_{\text{ns}} = \frac{q_{\text{nu}}}{\text{FOS}} = \frac{294}{3} = 98 \text{ KPa}$$

27. Factor of safety with respect to cohesion gives the same concept as that of factor of safety w.r.t.,
- (a) height (b) average shear strength (c) friction (d) None of these

Ans. (c)

28. The co-efficient of permeability of a soil is 5×10^{-5} cm/sec for a certain pore fluid. If the viscosity of the pore fluid is reduced to half, the co-efficient of permeability will be
- (a) 5×10^{-5} cm/sec (b) 10×10^{-5} cm/sec (c) 2.50×10^{-5} cm/sec (d) 1.25×10^{-5} cm/sec

Ans. (b)

$$K \propto \frac{1}{\mu}$$

$$\text{So, } \frac{K_1}{K_2} = \frac{\mu_1}{\mu_2} \quad \left[\mu_2 = \frac{\mu_1}{2} \right]$$

$$K_2 = \frac{\mu_2}{\mu_1} \times K_1 = 2K_1$$

$$= 2 \times 5 \times 10^{-5} = 10 \times 10^{-5}$$

29. Piping in soils occur when

- (a) the effective stress becomes zero (b) sudden change of permeability takes place
(c) the soil is fissured and cracked (d) the soil is highly porous

Ans. (a)

30. An invar tape is made up of any alloy of

- (a) Copper and Steel (b) Brass and Nickel
(c) Brass and Steel (d) Nickel and Steel

Ans. (d)

31. Which one of the following is carried out by two theodolite method?

- (a) Circular curve setting (b) Techeometric survey
(c) Geodetic survey (d) Astronomical survey

Ans. (a)

32. A fully saturated clay specimen in a consolidometer was subjected to a loading of 200 kN/m². After a period of time it was found that the average pore pressure in the specimen was 70 kN/m². The percentage of consolidation reached by then was

- (a) 70% (b) 65% (c) 35% (d) 29%

Ans. (b)

33. Theory of errors and adjustments deals with minimizing the effects of

- (a) Instrumental errors (b) Mistakes
(c) Systematic errors (d) Personal and accidental errors

Ans. (d)

34. A summit curve is formed at the intersection of 3% up gradient and 5% down gradient. To provide a stopping distance of 128 m, the length of summit curve needed will be

- (a) 271 m (b) 298 m (c) 322 m (d) 340 m

Ans. (b)

$$\text{Length of Summit Curve} = \frac{NS^2}{4.4} = L$$

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Here

$$S = \text{SSD}$$

$$N = 3 - (-5) = 8\%$$

$$L = \frac{0.08 \times 128^2}{4.4} = 298 \text{ m}$$

35. The process of determining the location of the station (on the map) occupied by the plane table is called as
- (a) intersection (b) three-point-problem (c) traversing (d) resection

Ans. (d)

36. For a circular curve of radius 200 m, the co-efficient of lateral friction is 0.15 and the design speed is 40 kmph, the equilibrium super elevation (for equal pressures on inner and outer wheels) would be
- (a) 21.3 (b) 7 (c) 6.3 (d) 4.6

Ans. (c)

37. A track bar is used for
- (a) interlocking points and signals (b) setting points and crossings
(c) setting marshalling yard signals (d) track maintenance

Ans. (b)

38. Which of the following structure is used for servicing and repairs of the air crafts?
- (a) Apron (b) Terminal building (c) Hanger (d) Holding apron

Ans. (a)

39. The dowel bars are used in rigid pavements to
- (a) prevent warping stresses (b) resist bending stresses
(c) transfer load from one slab to the next (d) resist bending and shear stresses

Ans. (c)

40. Reflection cracking is observed in
- (a) flexible pavement (b) bituminous overlay over cement concrete surface
(c) rigid pavement (d) rigid overlay over flexible pavement

Ans. (b)

41. The arrangement made when left hand rail of one track crosses the right hand rail of another track is known as

- (a) Acute angle crossing (b) Diamond crossing
(c) Square crossing (d) Obtuse angle crossing

Ans. (a)

42. The relation between the radius of curvature (R) and its degree of curvature (D) is given

- (a) $R = \frac{1750}{D}$ (b) $R = \frac{1580}{D}$
(c) $R = \frac{1786.5}{D}$ (d) $R = \frac{1850}{D}$

Ans. (a)

43. The movable tapered end of the tongue rail is known as

- (a) Stretcher bar (b) Heel of switch (c) Toe of switch (d) Throw of switch

Ans. (c)

44. What is the ratio of the elastic modulus of structural timber in longitudinal direction to that in the transverse direction?

- (a) 0.5 to 1 (b) 0.1 to 0.2 (c) 1 to 2 (d) 5 to 10

Ans. (c)

45. What treatment is adopted for making timber fire resistant?

- (a) Abel's process (b) ASCU treatment (c) Tarring (d) None of these

Ans. (a)

46. According to the relevant IS code, the weight of timber is to be reckoned at a moisture content of

- (a) 12% (b) 2% (c) 5% (d) 8%

Ans. (a)

47. The disease of dry rot in timber is caused by
- (a) Lack of proper ventilation (b) Alternate wet and dry conditions
(c) Complete submergence under water (d) None of these

Ans. (a)

48. A king closure is a
- (a) Full brick (b) Three fourth brick
(c) Crosswise half brick (d) Longitudinally half brick

Ans. (c)

49. For one cubic meter of brick masonry, the number of modular bricks needed is
- (a) 500 (b) 400 (c) 600 (d) 350

Ans. (a)

50. The minimum compressive strength of first class bricks should be
- (a) 5 N/mm² (b) 10 N/mm² (c) 15 N/mm² (d) 8.5 N/mm²

Ans. (b)

51. Which IS code is used for classification of timber for seasoning purposes?
- (a) IS : 1141 – 1958 (b) IS : 1708 – 1969 (c) IS : 4970 – 1973 (d) IS : 399 – 1963

Ans. (a)

52. The 'frog' of the brick in a brick masonry is kept on
- (a) bottom face (b) top face
(c) outer side of the wall (d) inner side of the wall

Ans. (b)

53. The fineness of cement is tested by
- (a) air-content method (b) air-permeability method
(c) le-chatelier (d) Vicat's apparatus

Ans. (b)

54. Which type of cement is recommended in large mass works, such as a dam?

- (a) OPC (b) High alumina cement
(c) Low heat Portland cement (d) Portland pozzolana

Ans. (c)

55. When a first class brick is immersed in cold water for 24 hours, it should not absorb water by weight more than

- (a) 20% (b) 10% (c) 15% (d) 5%

Ans. (a)

56. For complete hydration of cement, the water cement ratio is

- (a) Less than 0.25 (b) More than 0.25 but less than 0.35
(c) More than 0.35 but less than 0.45 (d) More than 0.45 but less than 0.60

Ans. (c)

57. The approximate proportion of dry cement mortar required for brick work is

- (a) 20% (b) 10% (c) 15% (d) 30%

Ans. (d)

58. What is the quantity of cement (in kg) and of dry sand (in cubic metre) respectively required for preparing one cubic metre of wet cement mortar of 1 : 5 proportion?

- (a) 310 and 1.05 (b) 290 and 1.05 (c) 280 and 1.00 (d) 280 and 2.00

Ans. (a)

59. In cements, generally the increase in strength during a period of 14 days to 28 days is primarily due to

- (a) C_3A (b) C_3S (c) C_2S (d) C_4AF

Ans. (b)

60. The grade of cement is determined by testing cement mortar of proportion of cement to sand

- (a) 1 : 2.0 (b) 1 : 2.5 (c) 1 : 3.0 (d) 1 : 3.5

Ans. (c)

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61. As per IS code of practice, concrete should be cured at
(a) 35°C (b) 25°C (c) 27°C (d) 50°C

Ans. (c)

62. The ratio of modulus of rupture to direct tensile strength of concrete is
(a) 4 (b) 2 (c) 0.75 (d) 1.0

Ans. (b)

63. The approx. ratio between the strength of cement concrete at 7 days and at 28 days is
(a) 3/4 (b) 2/3 (c) 1/2 (d) 1/3

Ans. (b)

64. What is the amount of water required for a workable RC of mix 1 : 2 : 4 by weight when w/c ratio is 0.60 and unit weight of concrete is 2,400 kg/m³.
(a) 165 L (b) 205 L (c) 245 L (d) 285 L

Ans. (a)

65. For a given material the Poisson's ratio 0.25, the ratio of Young's modulus and modulus of rigidity is
(a) 2.5 (b) 0.4 (c) 2.75 (d) 3.0

Ans. (a)

$$\begin{aligned} E &= 2G(1+\mu) \\ E/G &= 2(1+\mu) \\ &= 2(1+0.25) = 2.5 \end{aligned}$$

66. The symmetry of the stress tensor at a point in a body when at equilibrium is obtained from
(a) Conservation of energy (b) Moment equilibrium equations
(c) Force equilibrium equations (d) None of these

Ans. (b)

67. Slump and compaction factor are two different measure of workability of concrete. For a slump of 0 to 20, what is the equivalent range of compaction factor?
(a) 0.4 - 0.7 (b) 0.7 - 0.9 (c) 0.7 - 0.8 (d) 0.6 - 0.8

Ans. (c)

68. The number of independent elastic constants for a linear elastic isotropic and homogeneous material is
 (a) 4 (b) 3 (c) 2 (d) 1

Ans. (c)

69. An overhanging beam on both sides is acted upon by a uniformly distributed load (kN/m) throughout, overhanging on each side is L_1 m and clear span is L m. For maximum positive moment equal to the negative moment, what is the ratio of L_1 to L ?
 (a) 0.7071 (b) 0.3535 (c) 0.5 (d) 0.5773

Ans. (b)

Maximum positive moment = maximum negative moment

$$\frac{WL^2}{8} - \frac{WL_1^2}{2} = \frac{WL_1^2}{2}$$

$$\frac{WL^2}{8} = \frac{2WL_1^2}{2}$$

$$L_1 = \frac{L}{2\sqrt{2}}$$

$$\Rightarrow \frac{L_1}{L} = 0.35$$

70. A simply supported beam of length 10 m is acted upon by a clockwise moment of 100 kNm at the centre of the beam, the value of shear force at left support is
 (a) 20 kN (b) 10 kN (c) Zero (d) 1000 kN

Ans. (b)

$$R_A \times 10 + 100 = 0$$

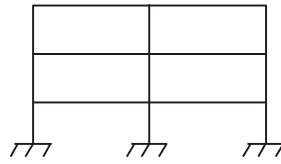
$$R_A = -\frac{100}{10}$$

$$R_A = -10 \text{ kN}$$

71. Shear span is defined as the zone where
 (a) Bending moment is constant
 (b) Shear force is constant
 (c) Shear force is zero
 (d) Bending moment is zero

Ans. (b)

72. The total (both internal and external) degree of static indeterminacy of the plane frame shown in the given figure is



- (a) 14 (b) 16 (c) 18 (d) 20

Ans. (c)

$$\begin{aligned} D_s &= (R_e - 3) + 3C - r_r \\ &= (9 - 3) + 3 \times 4 - 0 \\ &= 6 + 12 = 18 \end{aligned}$$

73. At a point in a steel member, the major principal stress is 200 N/mm² (tensile) and the minor principal stress is compressive. If the uniaxial tensile yield stress is 250 N/mm², then according to the maximum shear stress theory, the magnitude of the minor principal stress (compressive) at which yielding will commence is

- (a) 250 N/mm² (b) 150 N/mm² (c) 50 N/mm² (d) 200 N/mm²

Ans. (c)

$$\begin{aligned} \sigma_1 &= 200 \text{ N/mm}^2 \\ \sigma_2 &= -\sigma \\ \sigma_y &= 250 \text{ N/mm}^2 \\ \tau_{\max} &\leq \frac{\sigma_y}{2} \\ \frac{\sigma_1 - \sigma_2}{2} &\leq \frac{\sigma_y}{2} \\ 200 + \sigma &\leq 250 \\ \sigma &\leq 250 - 200 = 50 \text{ N/mm}^2 \end{aligned}$$

74. If a circular shaft is subjected to a torque T and a bending moment M, the ratio of the ratio of the maximum shear stress to the maximum bending stress is given by

- (a) 2M/T (b) 2T/M (c) T/2M (d) M/T

Ans. (a)

$$\frac{f}{y} = \frac{M}{I} = \frac{E}{R}$$

$$f = \frac{M \times y}{I} = \frac{M \cdot \frac{D}{2}}{\frac{\pi}{64} D^4} = \frac{32M}{\pi D^3}$$

$$\frac{\tau}{r} = \frac{T}{J} = \frac{C\theta}{L}$$

$$\tau = \frac{T \cdot r}{J} = \frac{T \cdot \frac{D}{2}}{\frac{\pi}{32} D^4} = \frac{16T}{\pi D^3}$$

$$\frac{\text{Bending Stress (f)}}{\text{Shear Stress (\tau)}} = \frac{32M \times \pi D^3}{\pi D^3 \times 16T} = \frac{2M}{T}$$

75. The stiffness matrix of a beam element is $(2EI/L) \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$ which one of the following is its flexibility matrix?

(a) $(L/2EI) \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$ (b) $(L/6EI) \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$ (c) $(L/4EI) \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$ (d) $(L/6EI) \begin{bmatrix} 1 & -2 \\ -2 & 1 \end{bmatrix}$

Ans. (b)

$$\text{Stiffness matrix} = \frac{2EI}{L} \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$$

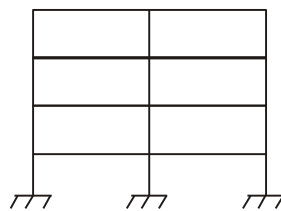
$$[s][f] = 1$$

$$[f] = [s]^{-1}$$

$$= \frac{L}{2EI(4-1)} \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$$

$$= \frac{L}{6EI} \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$$

76. Total degree of kinematic indeterminacy for the plane frame shown in the figure is given by



(a) 27

(b) 36

(c) 54

(d) 24

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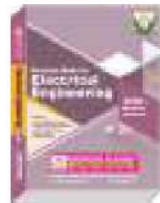
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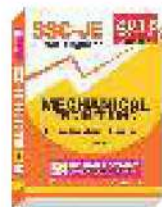


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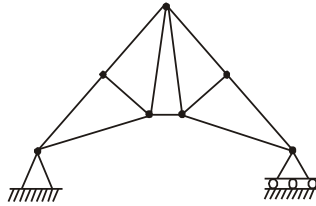
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Ans. (b)

$$\begin{aligned}
 D_k &= 3j - R_e - m'' + r_r \\
 &= 3 \times 15 - 9 - 0 + 0 \\
 &= 45 - 9 \\
 &= 36
 \end{aligned}$$

77. The kinematic indeterminacy of the plane truss shown in the figure is



(a) 11

(b) 8

(c) 3

(d) 0

Ans. (a)

$$\begin{aligned}
 D_k &= 2j - R_e \\
 &= 2 \times 7 - 3 = 14 - 3 = 11
 \end{aligned}$$

78. A propped cantilever of span L carries a vertical concentrated load at the mid-span. If the plastic moment capacity of the section is M_p , the magnitude of the collapse load is

(a) $8 M_p L$ (b) $6 M_p L$ (c) $4 M_p L$ (d) $2 M_p L$ **Ans. (b)**

$$W_c = \frac{6M_p}{L}$$

79. Flexibility method of structural analysis starts with

(a) Compatible deformation

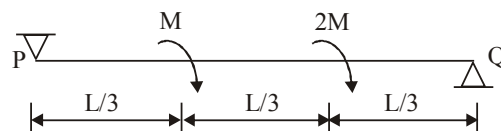
(b) Equilibrium condition

(c) Force deformation relation

(d) Equilibrium state of internal forces

Ans. (c)

80. The figure shows a simply supported beam PQ of uniform flexural rigidity EI carrying two moments M and $2M$

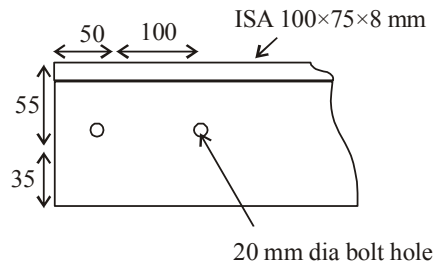


The slope at P will be

(a) 0

(b) $ML/(9EI)$ (c) $ML/(6EI)$ (d) $ML/(3EI)$ **Ans. (c)**

81. Determine block shear strength of tension member shown in figure if grade of steel is Fe-410



- (a) 309.06 kN (b) 216.49 kN (c) 258.49 kN (d) 326.54 kN

Ans. (d)

82. As per IS 800 : 2007, the cross-section in which the extreme fiber can reach the yield stress, but cannot develop the plastic moment of resistance due to failure by local buckling is classified as

- (a) Plastic section (b) Compact section (c) Semi-compact section (d) Slender section

Ans. (c)

83. A steel member 'M' has reversal of stress due to live loads, whereas another member 'N' has reversal of stress due to wind load. As per IS 800 : 2007, the maximum slenderness ratio permitted is

- (a) Less for member 'M' than that of member 'N'
 (b) More for member 'M' than for member 'N'
 (c) Same for both the members
 (d) Not specified in the code

Ans. (a)

84. Minimum percentage of longitudinal reinforcement in RCC column is

- (a) 1.2 (b) 0.6 (c) 0.8 (d) 1.0

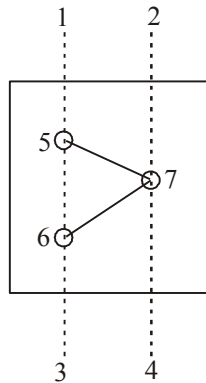
Ans. (c)

85. A T-Beam behaves as a rectangular beam of width equal to its flange if its neutral axis is

- (a) Coincides with centroid of reinforcement
 (b) Coincides with centroid of T-section
 (c) Remains within the flange
 (d) Remains in the web

Ans. (c)

86. Which section to be considered in the design for the net area of flat?



(a) 1-5-6-3

(b) 2-7-4

(c) 1-5-7-4

(d) 1-5-7-6-3

Ans. (d)

87. Minimum number of vertical bars in a circular column is

(a) 6

(b) 4

(c) 5

(d) 8

Ans. (a)

88. Gantt charts indicate

(a) Comparison of actual progress with the scheduled progress

(b) Balance of work to be done

(c) Progress cost of the project

(d) Inventory cost

Ans. (a)

89. A serious limitation of interdependencies between various activities is generally observed in

(a) Milestones chart

(b) Bar charts

(c) Job layouts

(d) Network analysis

Ans. (b)

90. In limit state design, the limiting depth of neutral axis for Fe-500 for beam having effective depth 'd' is

(a) 0.43 d

(b) 0.48 d

(c) 0.46d

(d) 0.53d

Ans. (c)

91. The probability of failure implied in the limit state design is of the order of
(a) 10^{-3} (b) 10^{-2} (c) 10^{-5} (d) 10^{-7}

Ans. (b)

92. Consider the following statements:

1. Fluids of low viscosity are all irrotational
2. Rotation of the fluid is always associated with shear stress.

Which of these statements is/are correct?

- (a) 1 only (b) 2 only (c) Both 1 and 2 (d) Neither 1 nor 2

Ans. (b)

93. The optimistic, most likely and pessimistic estimates of time for an activity are 4 days, 11 days and 12 days respectively. The expected completion time of this activity is
(a) 10 days (b) 11 days (c) 9 days (d) 5 days

Ans. (a)

$$t_0 = 4 \text{ days}$$

$$t_p = 12 \text{ days}$$

$$t_m = 11 \text{ days}$$

$$t_e = \frac{t_0 + 4t_m + t_p}{6}$$

$$= \frac{4 + 4 \times 11 + 12}{6} = 10 \text{ days}$$

94. In PERT analysis, the time estimates of activities correspond to
(a) Binomial distribution (b) β distribution
(c) Poisson's distribution (d) Normal distribution

Ans. (b)

95. If the pump head is 75 m, discharge is $0.464 \text{ m}^3/\text{s}$ and the motor speed is 1440 rpm at rated condition, the specific speed of the pump is about
(a) 4 (b) 26 (c) 38 (d) 1440

Ans. (c)

96. Water flows through a 100 mm diameter pipe with a velocity of 0.015 m/sec. If the kinematic viscosity of water is 1.13×10^{-6} m²/sec, the friction factor of the pipe material is

- (a) 0.0015 (b) 0.032 (c) 0.037 (d) 0.048

Ans. (d)

97. A discharge of 1 cumec is flowing in a rectangular channel one metre wide at a depth of 20 cm. The bed slope of channel is

- (a) mild (b) critical (c) steep (d) adverse

Ans. (c)

98. The performance of a well is measured by its

- (a) specific capacity (b) specific yield
(c) storage co-efficient (d) permeability co-efficient

Ans. (a)

99. If a water tank, partially filled with water is being carried on a truck, moving with a constant horizontal acceleration, the level of water in the tank;

- (a) rise and fall alternately on the front side of the tank
(b) fall on rear side of the tank
(c) remain the same on both sides of the tank
(d) rise on the rear side and fall on the front side of the tank

Ans. (d)

100. The function of an air vessel in a reciprocating pump is to obtain

- (a) reduction of suction head (b) rise in delivery head
(c) continuous supply of water at uniform rate (d) increase in supply of water

Ans. (c)





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