BMO,BMP
PROVISIONAL ANSWER KEY

Name of the post	**Assistant Engineer (Civil), Class-2, Road and Building Department**
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THE LINK FOR ONLINE OBJECTION SYSTEM WILL START FROM 14-05-2025; 10:00 AM ONWARDS

Instructions / સૂચના

Candidate must ensure compliance to the instructions mentioned below, else objections shall not be considered: -

(1) Candidates have to pay fees of Rs.100/- for each objection. The fees can be paid from the link given herewith.

(2) The Candidate will be able to submit objection only after payment of the fees. The generation of the receipt will only be considered as final submission.

(3) The Candidate must retain the receipt of the payment of the fees. The fees, once paid, will not be refunded under any circumstances.

(4) All the objections should be submitted through **ONLINE OBJECTION SUBMISSION SYSTEM** only. Physical or submission through any other means will not be considered.

(5) All objections are to be submitted with reference to the Master Question Paper published with provisional answer key, published herewith on the website / online objection submission system. Objections should be sent referring to the Question No. & options of the Master Question Paper. Objections regarding question nos. and options other than provisional answer key (Master Question Paper) shall not be considered.

(6) Objections and answers suggested by the candidate should be in compliance with the responses given by him in his answer sheet. Objections shall not be considered, in case, if responses given in the answer sheet /response sheet and submitted objections are differed.

(7) Supportive document to the objection must be uploaded, without which objection will not be considered.

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(1) ઉમેદવારે દરેક વાંધા દીઠ રૂપિયા ૧૦૦/-ફી ભરવાની રહેશે. જે ફી આ સાથે આપેલ લીંક ઉપરથી ભરી શકાશે.

(2) ફી ભર્યા બાદ જ વાંધો સબમીટ થઈ શકશે. ફી ભર્યાની આખરી પહોંચ જ આખરી સબમીશન ગણાશે.

(3) ફી ભર્યાની પહોંચ ઉમેદવારે સાચવી રાખવાની રહેશે. એક વાર ભરેલ ફી કોઈ પણ પરિસ્થિતિમાં પરત આપવામાં આવશે નહિ.

(4) વાંધા ફક્ત **ઓનલાઈન ઓબ્જેકશન સબમીશન સીસ્ટમ** દ્વારા જ સબમીટ કરવાના રહેશે. રૂબરૂ, ટપાલ અથવા ઈ-મેઈલ કે અન્ય કોઈ રીતે આયોગને મોકલવામાં આવેલ વાંધા ધ્યાને લેવામાં આવશે નહીં, જેની ખાસ નોંધ લેવી.

(5) ઉમેદવારે પોતાને પરીક્ષામાં મળેલ પ્રશ્નપુસ્તિકામાં છપાયેલ પ્રશ્નક્રમાંક મુજબ વાંધા-સૂચનો રજૂ ન કરતાં, તમામ વાંધા-સૂચનો વેબસાઈટ પર પ્રસિધ્ધ થયેલ પ્રોવિઝનલ આન્સર કી (માસ્ટર પ્રશ્નપત્ર) ના પ્રશ્નક્રમાંક મુજબ અને તે સંદર્ભમાં રજૂ કરવા. માસ્ટર પ્રશ્નપત્રમાં નિર્દિષ્ટ પ્રશ્ન અને વિકલ્પ સિવાયના વાંધા ધ્યાને લેવામાં આવશે નહીં.

(6) ઉમેદવારે પ્રશ્નના વિકલ્પ પર વાંધો રજૂ કરેલ છે અને વિકલ્પ રૂપે જે જવાબ સૂચવેલ છે એ જવાબ ઉમેદવારે પોતાની ઉત્તરવહીમાં આપેલ હોવો જોઈએ. ઉમેદવારે સૂચવેલ જવાબ અને ઉત્તરવહીનો જવાબ ભિન્ન હશે તો ઉમેદવારે રજૂ કરેલ વાંધા ધ્યાને લેવાશે નહીં.

(7) વાંધા માટે સંદર્ભ જોડવો આવશ્યક છે, જેના વિના વાંધો ધ્યાને લેવામાં આવશે નહીં.

Website link for online objection submission system: https://www.formonline.co.in/GPSC_TRACK/SearchPage.aspx

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1. **Whenever the available natural ground slope is steeper than the designed bed slope of the channel, then the difference is adjusted by constructing**

   (A) Canal fall **(B) Canal escape**

   (C) Canal head regulator **(D) Spillway**

2. **Maximum bending moment in a fixed beam of span 6 m with 4 kN/m uniformly distributed load is**

   (A) 12 kN.m **(B) 18 kN.m**

   (C) 6 kN.m **(D) 14.4 kN.m**

3. **Carryover moment in moment distribution method is defined as**

   (A) The moment applied at one end to cause unit moment

   (B) The moment developed or induced at one end due to a moment at another end

   (C) The additional moment applied at one end to complete equilibrium

   (D) None of the above

4. **An over-reinforced RC beam fails by**

   (A) Compression failure **(B) Tensile failure**

   (C) Ductile failure **(D) Cannot fail**

5. **The critical section for one-way shear in a RC footing lies at a distance**

   (A) "d" from the face of the column

   (B) "1.5d" from the face of the column

   (C) "2d" from the face of the column

   (D) "2.5d" from the face of the column

6. **Use of pozzolanic material in concrete**

   (A) Improves workability

   (B) Decreases bleeding

   (C) Both (A) and (B)

   (D) None of the above

7. **Dynamic viscosity of the fluid has the dimensions as**

   (A) MLT-2 **(B) ML-1T-1**

   (C) ML-1T-2 **(D) M-1L-1T-1**

8. **The streamline is a line**

   (A) Which is along the path of particle

   (B) Across which there is no flow

   (C) Which is always parallel to main direction of flow

   (D) On which tangent at any point gives velocity

9. Bernoulli's equation is derived making assumptions that
   (A) The flow is uniform and incompressible
   (B) The flow is steady, viscous and non-uniform
   (C) Flow is steady, non-viscous, incompressible and irrotational
   (D) None of the above

10. An orifice is known as large orifice when head of liquid from the centre of circle is
   (A) More than 10 times the depth of orifice
   (B) Less than 10 times the depth of orifice
   (C) More than 10 times the diameter of the circle
   (D) Less than 5 times the depth of orifice

11. Hydraulic Gradient Line (H.G.L.) represents the sum of
   (A) Pressure head and kinetic head
   (B) Kinetic head and datum head
   (C) Pressure head, kinetic head and datum head
   (D) Pressure head and datum head

12. Water from the well naturally forces to the surface under pressure from a confined aquifer is
   (A) Drilled well
   (B) Drift well
   (C) Artesian well
   (D) Gravity well

13. Most of the weather phenomena take place in the
   (A) Troposphere
   (B) Stratosphere
   (C) Mesosphere
   (D) Ionosphere

14. Average annual rainfall in India is a figure obtained by taking average of a period of
   (A) 35 years
   (B) 50 years
   (C) 20 years
   (D) 25 years

15. For a flow in a gravity conduit, the hydraulic gradeline will
   (A) Always coincide with the water surface
   (B) Always below the water surface
   (C) Always above the water surface
   (D) None of the above

16. Mach number in a fluid mechanics is the ratio of
   (A) Speed of sound in the fluid to the speed of fluid
   (B) Discharge velocity to viscosity of fluid
   (C) Viscosity to discharge velocity of fluid
   (D) Speed of a fluid to the speed of sound in the fluid

17. The boundary layer separation takes place if
(A) Pressure gradient is zero
(B) Pressure gradient is positive
(C) Pressure gradient is negative
(D) None of the above

18. Three-Point Problem in surveying can be solved by
(A) Lehmann's method
(B) Bessel's method
(C) Mechanical method
(D) All of the above

19. Movement of ground water depends on
(A) Slope of ground water surface
(B) Hydraulic properties of soil
(C) Temperature of water
(D) All of the above

20. The California Bearing Ratio (CBR) method provides an indication of the
(A) Strength of road construction
(B) Materials used in road construction
(C) Strength and materials used in road construction
(D) None of the above

21. Ruling gradients of roads on plains terrain should be
(A) 1 in 30
(B) 1 in 10
(C) 1 in 20
(D) 1 in 12.5

22. The least amount of time it can take to complete a task is
(A) Mean time of activity
(B) Time of activity
(C) Optimistic time of activity
(D) Short time of activity

23. The average perception-reaction time used for calculating Stopping Sight Distance (SSD) is
(A) 1.5 seconds
(B) 2.0 seconds
(C) 2.5 seconds
(D) 3.0 seconds

24. Which of the following compound is responsible for the early strength of concrete?
(A) Tricalcium Aluminaferrite
(B) Dicalcium Silicate
(C) Gypsum
(D) Tricalcium Silicate

25. The durability of concrete is proportional to

(A) Water-cement ratio

(B) Aggregate cement ratio

(C) Cement aggregate ratio

(D) Sand content

26. The shrinkage of concrete is directly proportional to

(A) Water content at the time of mixing

(B) Sand content

(C) Coarse aggregate content

(D) Aggregate to cement ratio

27. Creep in concrete is associated with

(A) Removal of moisture

(B) Removal of load

(C) Addition of load

(D) Time

28. The bending moment acting on the plate of an element will cause the stresses on the plane:

(A) Transverse shear stress

(B) Axial stress

(C) Tension stress

(D) Normal stress

29. The maximum bending moment caused by a moving load on a fixed beam is

(A) At the support end

(B) Under the load only

(C) At mid span

(D) None of the above

30. The shear stress on a beam section is maximum

(A) At the centroid of the section

(B) On the extreme free surface fibres

(C) At the neutral axis but not at centroid

(D) At the free edges

31. The bending stress on a T-beam section is maximum at

(A) Top fibre

(B) Centroid

(C) Depends on the moment

(D) Bottom fibre

32. The radius of gyration of a section is proportional to

(A) Depth of section

(B) Width of section

(C) Depth or width of section

(D) Area of section

33. The planes of principal stresses are associated with
(A) Sum of the normal stresses
(B) Difference of the normal stresses
(C) Independent of normal stresses
(D) Independent of shear stress

34. The ratio of volume of voids to the total volume of soil mass is called
(A) Porosity
(B) Air content
(C) Void ratio
(D) Solid content

35. A soil sample has a specific gravity of 2.6 and a void ratio of 0.78. The water content required to fully saturate the soil will be
(A) 5%
(B) 10%
(C) 20%
(D) 30%

36. Toughness index of the soil is the ratio of
(A) Plasticity index to the flow index
(B) Liquidity index to the flow index
(C) Consistency index to the flow index
(D) Shrinkage index to the flow index

37. The maximum size of the particle of the clay is
(A) 0.2 mm
(B) 0.02 mm
(C) 0.002 mm
(D) 0.0002 mm

38. If the permeability of a soil is 0.8 mm/sec, then the type of soil is
(A) Clay
(B) Gravel
(C) Silt
(D) Sand

39. Maximum allowable shear stress (Tc max) in concrete depends on
(A) Grade of concrete and grade of steel
(B) Grade of steel only
(C) Grade of concrete only
(D) Percentage of steel only

40. In concrete mix design, the assumed standard deviation for different grade of concrete shall be
(A) 2.0 to 3.0
(B) 4.0 to 5.0
(C) 5.0 to 6.0
(D) Assumed standard deviation cannot be permitted

41. Minimum period for removal of vertical formwork to columns, walls, beams in normal as per IS 456:2000 is

(A) 06 – 12 hours
(B) 12 – 15 hours
(C) 2 days
(D) 16 – 24 hours

42. IS 875 Part 2 is the code of practice for

(A) Dead loads
(B) Live loads
(C) Dead and live loads
(D) Wind loads

43. The unsupported length of a reinforced concrete column shall be

(A) Sixty times the least cross-sectional dimension
(B) Double to effective length of column
(C) Clear distance between end restraints
(D) Same as the effective length

44. The development length in a bar used in reinforced concrete is for

(A) Tension reinforcement only
(B) Compression reinforcement only
(C) Both (A) and (B)
(D) Shear reinforcement only

45. Curtailment of bars can be made from the distance beyond the point there is no flexure load to resist equal to

(A) Effective depth of the member
(B) 12 times the bar diameter
(C) Minimum of (A) or (B)
(D) Greater of (A) or (B)

46. In deciding lap length including anchorage value of hooks for bars in flexural tension is related

(A) 10 times the nominal diameter of bar
(B) 30 times the nominal diameter of bar
(C) 40 times the nominal diameter of bar
(D) Independent of the nominal diameter of bar

47. A simply supported beam shall be deemed to be a deep beam when the ratio of effective span to overall depth is

(A) More than 1.5
(B) More than 2
(C) More than 2.5
(D) Less than 2

48. In an interior span of flat slab, the negative design moment is taken as

(A) 0.50 times the total design moment

(B) 0.65 times the total design moment

(C) 0.70 times the total design moment

(D) 0.40 times the total design moment

49. The term 'characteristic load' means that value of load which has _____ probability of not being exceeded.

(A) 95 percent

(B) 90 percent

(C) 100 percent

(D) 80 percent

50. Partial safety factor for material strength in the limit stale of collapse is

(A) 1.5 for concrete and 1.15 for steel

(B) 1.15 for concrete and 1.5 for steel

(C) 1.5 for both concrete and steel

(D) 1.15 for both concrete and steel

51. In limit state of collapse for flexure, the tensile strength of concrete is

(A) To be considered same as compressive strength

(B) 0.42 times the compressive strength

(C) To be ignored

(D) Partially considered

52. Effective length of a column effectively held in position at both ends but not restrained against rotation is

(A) 0.8 × unsupported length

(B) 0.65 × unsupported length

(C) 1.2 × unsupported length

(D) Same as unsupported length

53. The thickness for single lacings flat lacing bars shall not be less than

(A) one-sixtieth of its effective length

(B) one-twentieth of its effective length

(C) one-fortieth of its effective length

(D) half the minimum thickness of main member

54. Stiffness matrix diagonal elements

(A) are always positive in value

(B) can be a negative in value

(C) cannot be zero

(D) Both (A) and (C)

55. In counterfort retaining walls, the main reinforcement in the stem at support is
(A) Not provided
(B) Provided only on inner face
(C) Provided only on front face
(D) Provided both on inner and front face

56. Total deflection at any point is equal to the sum of the deflections caused by each individual load separately is stated in which of the following?
(A) Theory of transmissibility
(B) Principal of resolution
(C) Principal of superposition
(D) Lami's theorem

57. Factor used to obtain the design seismic force depending on the functional use of the structure is
(A) Zone factor
(B) Importance factor
(C) Response factor
(D) Time history factor

58. Distance between centre of mass and centre of rigidity of floor is
(A) Drift
(B) Floor displacement
(C) Base displacement
(D) Static eccentricity

59. The cross drainage work in which the drain is taken over the canal such that canal water runs below the drain under symphonic pressure is known as
(A) Super passage
(B) Syphon aqueduct
(C) Syphon
(D) Aqueduct

60. The square root of ratio of inertia force to gravity force is known as
(A) Reynolds number
(B) Froude's number
(C) Euler's number
(D) Weber's number

61. Chain surveying is most suitable when
(A) Ground is fairly level and open with simple details
(B) Area is small in extent
(C) Plans are required on a larger scale
(D) All of the above

62. The longest chainline passing through the centre of the area is called
(A) Base line
(B) Tie line
(C) Check line
(D) All of the above

63. If quadrantal bearing of a line is N 35° W, then whole circle bearing is

(A) 325° (B) 205°

(C) 215° (D) 315°

64. Sensitivity of a bubble tube is expressed by

(A) Length of level tube

(B) Radius of level tube

(C) Length of bubble of level tube

(D) None of the above

65. In a compaction test, with increase in compactive effort

(A) Both maximum dry density and optimum moisture content increases

(B) Both maximum dry density and optimum moisture content decreases

(C) Maximum dry density increases but optimum moisture content decreases

(D) Maximum dry density decreases but optimum moisture content increases

66. The upstream slope of an earth dam under steady seepage condition is

(A) Equipotential line (B) Phreatic line

(C) Flow line (D) Seepage line

67. In the soil sample of a consolidometer test, pore water pressure is

(A) Minimum at the centre (B) Maximum at the top

(C) Maximum at the bottom (D) Maximum at the centre

68. The stress at which a material fractures under a large number of reversals of stress is called

(A) Endurance limit (B) Creep

(C) Ultimate strength (D) Residual stress

69. The shear stress distribution over a rectangular cross-section of a beam follows

(A) A straight line path (B) A circular path

(C) A parabolic path (D) An elliptical path

70. The unit of measurement for electric wiring or of electrification of light, fan, plug points is in

(A) Point (B) Meter

(C) Numbers (D) No unit

71. When a contractor is paid certain percentage over the actual cost of the construction as his profit, such contract is called

(A) Lump-sum contract (B) Work order

(C) Schedule contract (D) Cost plus percentage contract

72. In case of summit curve, the deviation angle will be maximum when

(A) an ascending gradient meets with another ascending gradient

(B) an ascending gradient meets with a descending gradient

(C) a descending gradient meets with another ascending gradient

(D) an ascending gradient meets with a level surface

73. The presence of free ammonia in sewage is detected by

(A) Boiling

(B) Adding potassium permanganate

(C) Adding sulphuric acid

(D) Adding phenol

74. In a single-threaded worm and worm wheel, the number of teeth on the worm is 50. The diameter of the effort wheel is 100 mm and that of load drum is 50 mm. The velocity ratio is

(A) 50 (B) 100

(C) 150 (D) 200

75. A couple produces

(A) translatory motion

(B) rotational motion

(C) combined translatory and rotational motion

(D) None of the above

76. A ladder is resting on a rough ground and leaning against a smooth vertical wall. The force of friction will act

(A) downward at its upper end

(B) upward at its upper end

(C) zero at its upper end

(D) perpendicular to the wall at its upper end

77. A beam AB is fixed at both ends and carries a uniformly distributed load of intensity w per unit length run over its entire length. Due to some constructional defects, the end B is now reduced to a simple support. The percentage increase in bending moment at A is

(A) 25 (B) 50

(C) 75 (D) 100

78. If the loading on a prestressed rectangular beam is uniformly distributed, then the tendon to be provided should be

(A) Straight below centroidal axis

(B) Parabolic with convexity downward

(C) Parabolic with convexity upward

(D) Straight above centroidal axis

79. If the maximum and minimum resultant forces of two forces acting on a particle are 40 kN and 10 kN respectively, then the two forces in question would be

(A) 25 kN and 15 kN

(B) 20 kN and 20 kN

(C) 20 kN and 10 kN

(D) 20 kN and 5 kN

80. In a critical path network, which of the following are involved?

1. A series of interconnected activities.
2. Consideration for uncertainties in time estimates.
3. A logical sequence of activities is provided.
4. The node number at the arrowhead is numerically smaller than that at tail end.

Select the correct option from below:

(A) 1 and 2 (B) 2 and 3 (C) 3 and 4 (D) 1 and 3

81. A cement concrete road is 1000 m long, 8 m wide and 15 cm thick over the sub-base of 10 cm thick gravel. The box cutting in road crust is

(A) 500 m^3

(B) 1000 m^3

(C) 1500 m^3

(D) 2000 m^3

82. A portion of an embankment having a uniform up-gradient 1 in 500 is circular with radius 1000 m of the centre line. It subtends 180° at the centre. If the height of the bank is 1 m at the lower end and side slopes 2 : 1, then the earth work involved is

(A) 26,000 m^3

(B) 26,500 m^3

(C) 27,000 m^3

(D) 27,500 m^3

83. Consider the following operations:

1. Drilling
2. Blasting
3. Mucking
4. Placing steel
5. Placing concrete

The correct sequence of these operations in tunnel construction is

(A) 1, 2, 4, 3, 5

(B) 1, 3, 2, 4, 5

(C) 1, 2, 3, 4, 5

(D) 1, 3, 4, 2, 5

84. Consider the following statements:
Assertion (A): For a given depth of cut, the output of a power shovel can be increased by decreasing the angle of swing.
Reason (R): If the angle of swing is decreased, the cycle time will be decreased.
(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

85. Consider the following statements:
In the critical path method of construction planning, Free Float can be
1. Greater than Total Float
2. Greater than Independent Float
3. Equal to Total Float
4. Less than Independent Float
(A) 1 and 4 are correct
(B) 2 and 3 are correct
(C) 1 and 3 are correct
(D) 1 and 2 are correct

86. When a star is between the pole and the horizon, the relationship between latitude (λ), zenith distance (z) and declination δ is
(A) $\theta = z + \delta$
(B) $\theta = \delta - z$
(C) $\theta = 180° - (z + \delta)$
(D) $\theta = (z + \delta) - 180°$

87. α and β are the angles subtended by a point of elevation h at their air station with respective plumb points. Photo scale and focal length of the lens being 'S' and 'f' respectively. Parallax displacement of the point due to relief is
(A) $h\tan\alpha/S$
(B) $h\tan\beta/S$
(C) $h(\tan\alpha + \tan\beta)/S$
(D) $h(\tan\alpha - \tan\beta)/S$

88. Pick up the correct statement from the following.
The difference between the longitudes of the places is obtained
(A) By subtracting their longitudes if places are in the same hemisphere
(B) By adding their longitudes if places are in the different hemispheres
(C) By subtracting the sum of their longitudes exceeding 180° from 360° if places are in different hemispheres
(D) All of the above

89. Which of the following statements is incorrect?
(A) Error due to refraction may not be completely eliminated by reciprocal levelling.
(B) Tilting levels are commonly used for precision work.
(C) The last reading of levelling is always a foresight.
(D) All of the above statements are incorrect.

90. American method of tunneling

(i) Is suitable for large sized tunnels

(ii) Is not suitable for railway or highway tunnels

(iii) Requires heavy timbers

Select the correct option from below:

(A) Only (i) is correct

(B) (i) and (iii) are correct

(C) (ii) and (iii) are correct

(D) (i) and (ii) are correct

91. Consider the following statements:

Assertion (A): When rock conditions are favorable, it will not be necessary to take up concrete lining concurrently with the driving operations till the full length of the tunnel has been driven through rock.

Reason (R): A tunnel through rock, hard or soft, does not need any concrete lining

Select the correct option from 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

92. Consider the following surveys

i) Reconnaissance survey

ii) Preliminary survey

iii) Traffic survey

iv) Location survey

The correct sequence in which these surveys are conducted before the alignment of a track is finalised is

Select the correct option from below:

(A) i, iii, ii, iv

(B) i, iii, iv, ii

(C) iii, i, iv, ii

(D) iii, i, ii, iv

93. Penetration test on bitumen is used for determining its

(A) Grade

(B) Viscosity

(C) Ductility

(D) Temperature susceptibility

94. Scientific planning of transportation system and mass transit facilities in cities should be based on

(A) spot speed data

(B) origin and destination data

(C) traffic volume data

(D) accident data

95. If the stopping distance and average length of a vehicle are 18 m and 6 m respectively, then the theoretical maximum capacity of a traffic lane at a speed of 10 m/sec is

(A) 1500 vehicles per hour

(B) 2000 vehicles per hour

(C) 2500 vehicles per hour

(D) 3000 vehicles per hour

96. When a ship floats at its designed water line, the vertical distance from water line to the bottom of the ship is known as

(A) Beam

(B) Depth

(C) Free-board

(D) Draft

97. Dead weight tonnage of a ship

(i) varies with latitude and season

(ii) is more than displacement tonnage

(iii) is the difference between displacement load and displacement light.

Of these above statements, select the correct option from below:

(A) (i) and (ii) are correct

(B) (ii) and (iii) are correct

(C) (i) and (iii) are correct

(D) Only (iii) is correct

98. By increasing the rise of lock gates,

(i) The length of the lock gate will increase

(ii) Transverse stress due to water pressure on the gate will increase

(iii) Compressive force on the gate will increase

Select the correct option from below:

(A) (i) and (ii) are correct

(B) (i) and (iii) are correct

(C) Only (ii) is correct

(D) Only (iii) is correct

99. To cope up high temperature of 196°C, the taxi ways and aprons are constructed with

(A) Asphaltic concrete

(B) Rubberized tar concrete

(C) Plain concrete

(D) All of the above

100. Which of the following is a critical parameter to control the cracking in the flexible pavement?

(A) Vertical strain at the bottom of the bituminous layer

(B) Tensile strain at the top of the subgrade

(C) Vertical strain at the top of the subgrade

(D) Tensile strain at the bottom of the bituminous layer

101. The fire demand of a city may be worked out by

(A) Kuichling's formula

(B) Freeman formula

(C) Bustan's formula

(D) All of the above

102. Acidity in water is caused due to

(A) Mineral acids

(B) Free CO_2

(C) Aluminium sulphate

(D) All of the above

103. The R.L. of ground water table on the sides of a valley is 1505 m whereas R.L. of the stream water is 1475 m. If 60° slope consists of pervious soil between R.L. 1485 m to 1500 m, then the gravity spring may be expected at the point of reduced level

(A) 1500 m

(B) 1505 m

(C) 1485 m

(D) 1475 m

104. When the reduced level of the water source is higher than the reduced level of the consumer's place, water is generally supplied

(A) By pumping system

(B) By gravitational system

(C) Both (A) and (B)

(D) All of the above

105. Surcharge storage zone of a reservoir is

(A) Below dead storage

(B) Between dead storage and useful storage

(C) Above useful storage

(D) Also known as valley storage

106. 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

107. The population of a town in three consecutive years are 5000, 7000 and 8400 respectively. The population of the town in the fourth consecutive year according to geometrical increase method is

(A) 9500 (B) 9800

(C) 10100 (D) 10920

108. The total weight of a pycnometer with water and ovendried soil 20 (g) is 1600 g. The pycnometer filled with water alone weighs 1500 g. The specific gravity of the soil is Cancelled

(A) 1 (B) 1.5

(C) 2 (D) 2.5

109. A pile is being driven with a drop hammer weighing 1800 kg and having a free fall of 1.00 m. If the penetration with last blow is 5 mm, then the load carrying capacity of the pile according to the Engineering News formula is

(A) 100 tonnes (B) 50 tonnes

(C) 20 tonnes (D) 10 tonnes

110. If dry density, water density and specific gravity of solids of a given soil sample are 1.6 glee, 1.84 g/cc and 2.56 respectively, then the void ratio of the soil sample is Cancelled

(A) 0.4 (B) 0.5

(C) 0.6 (D) 0.75

111. Pick up the incorrect statement from the following:
The soils which contain montmorillonite minerals

(A) swell more when wet

(B) shrink more when dry

(C) possess high plasticity

(D) possess high coefficient of internal coefficient

112. The void ratio of a soil sample decreases from 1.50 to 1.25 when the pressure is increased from 25 tonnes/m^2 to 50 tonnes/m^2, the coefficient of compressibility is

(A) 0.01 (B) 0.02

(C) 0.05 (D) 0.001

113. A tank 4m × 3m × 2m containing an oil of specific gravity 0.83 is moved with an acceleration g/2 m-sec. The ratio of the pressures at its bottom when it is moving vertically up and down is

(A) 2 (B) 3

(C) 1/2 (D) 1/3

114. The field compression curve is predicted from the laboratory compression curve using
(A) Schmertmann's method
(B) Casagrande's method
(C) Terzaghi's method
(D) Atterberg's method

115. What is the climate pattern in areas of limited size or immediate surroundings of plant and animal called?
(A) Mixed climate
(B) Macroclimate
(C) Microclimate
(D) None of the above

116. A relatively dense layer of band which is found in the thermosphere is known as
(A) Troposphere
(B) Mesosphere
(C) Stratosphere
(D) Ionosphere

117. Which of the following is not a secondary air pollutant?
(A) Ozone
(B) Photochemical smog
(C) Sulphur dioxide
(D) All (A), (B) & (C)

118. The estimated percentage of the forest land that ideally India should have is
(A) 50%
(B) 15%
(C) 33%
(D) 44%

119. Which of the following country has the maximum number of tube wells in the world?
(A) India
(B) China
(C) USA
(D) Brazil

120. If a tension crack is developed at the top of wall to a depth Z_0 in cohesive soils, then the total net pressure is zero up to
(A) $2Z_0$
(B) $3Z_0$
(C) $4Z_0$
(D) $5Z_0$

121. Exposed portions of vertical surface at right angles to the door or window frame are known as
(A) Lintels
(B) Reveals
(C) Soffits
(D) Jambs

122. Engineer's units of force is
(A) Newton in absolute units
(B) Dyne in absolute units
(C) Newton and dyne in absolute units
(D) All of the above

123. _____is known as an ideal transition curve.
(A) Clothoid
(B) Cubic parabola
(C) Lemniscate curve
(D) None of the above

124. Which factor/s should be considered in climate control in built environment?

(A) Selection of site

(B) Architectural design

(C) Selection of materials

(D) All of the above

125. Which steps are followed while performing repairs of distressed structure?

(A) Evaluation, method and material, preparation of drawing, selection of contractor, execution of work

(B) Method and material, preparation of drawing, selection of contractor, execution of work, evaluation

(C) Preparation of drawing, selection of contractor, execution of work, evaluation, method and material

(D) None of the above

126. In a tension test on a bar, gauge length means

(A) grip to grip distance

(B) the length over which the extensometer grips

(C) the length over which extension is measured

(D) none of the above

127. Consider the following statements:

Assertion (A): In the case of steel, stress at the breaking point is less than at the ultimate point.

Reason (R): The above statement refers to nominal stress but not to true stress.

(A) Both (A) and (R) are correct and reason is the correct explanation for the assertion

(B) Both (A) and (R) are correct, but reason is not the correct explanation for the assertion

(C) (A) is correct but (R) is false

(D) (A) is false but (R) is correct

128. Find the horizontal thrust at the left support in a three-hinged parabolic arch with a span of 40 m and a central rise of 5. It carries a point load of 100 kN at 10 m from the left support. In this case, the horizontal thrust is

(A) 75 kN

(B) 100 kN

(C) 250 kN

(D) 500 kN

129. Consider the following statements:

Assertion (A): The plastic neutral axis is also known as the equal area section.

Reason (R): The plastic neutral axis divides the section into areas of tension and compression equally.

(A) Both (A) and (R) are correct and reason is the correct explanation for the assertion

(B) Both (A) and (R) are correct but reason is not the correct explanation for the assertion

(C) (A) is correct but (R) is false

(D) (A) is false but (R) is correct

130. Partial safety factor for dead load, imposed load and wind load for limit state of collapse are respectively

(A) 1.5, 1.5, 1.0

(B) 1.5, 1.2, 1.0

(C) 1.2, 1.2, 1.5

(D) 1.2, 1.2, 1.2

131. The minimum number of bars to be provided in a circular column is

(A) 4

(B) 6

(C) 8

(D) 12

132. The coefficient of subgrade friction is 1.5. The unit weight of the concrete and the length of the slab are 2400 kg/cm^2 and 4.5 m respectively. Estimate the frictional stress developed in cement concrete pavement.

(A) 0.79 kg/cm^2

(B) 0.81 kg/cm^2

(C) 0.83 kg/cm^2

(D) 0.85 kg/cm^2

133. Consider the following statements:

Assertion (A): In R.C. design, the nominal shear stress t_v should not exceed t_{cmax} specified by code.

Reason (R): If t_v exceeds t_{cmax}, then there will be compression failure of concrete instead of ductile failure of steel.

(A) Both (A) and (R) are correct and reason is the correct explanation for the assertion

(B) Both (A) and (R) are correct, but reason is not the correct explanation for the assertion

(C) (A) is correct, but (R) is false

(D) (A) is false, but (R) is correct

134. Yield line theory results in

(A) elastic solution

(B) lower bound solution

(C) upper bound solution

(D) unique solution

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

136. When is a masonry wall known as a shear wall?
(A) If the earthquake load is out-of-plane
(B) If the earthquake load is in-plane
(C) If it is unreinforced
(D) If it is placed as infill to the frame

137. Minimum edge distances specified by the code should be maintained to avoid
(A) rupture of plate
(B) shearing of plate
(C) crushing of plate
(D) both (A) and (C)

138. The most economical section for a compression member is
(A) rectangular
(B) I-shaped
(C) circular
(D) hollow circular

139. The strength of timber is maximum when the load applied is
(A) Perpendicular to grain
(B) Inclined at 45° to grain
(C) Parallel to grain
(D) Same in all orientations

140. The Vicat apparatus is used to determine
(A) Consistency and setting time of cement
(B) Strength of hardened cement paste
(C) Soundness of cement
(D) Fineness modulus of cement

141. In a slump test, a shear slump indicates
(A) Well-graded aggregates
(B) High workability
(C) Excessive water content
(D) Harsh and non-cohesive mix

142. The presence of excess gypsum in cement can lead to
(A) Rapid setting of cement
(B) Expansion and cracking in hardened concrete
(C) Reduced durability of concrete
(D) Decreased workability

143. In a Los Angeles Abrasion test for aggregates, a high abrasion value indicates

(A) High resistance to wear

(B) High resistance to crushing

(C) Low resistance to wear

(D) High durability in high-stress environments

144. The stress-strain curve of concrete is non–linear primarily due to

(A) Presence of unhydrated cement particles

(B) Plastic behaviour of aggregate particles

(C) Microcracking in the cement matrix

(D) High tensile strength of concrete

145. The split tensile strength test is preferred over the direct tensile test for concrete because

(A) It produces uniform tensile stress distribution

(B) It prevents premature failure due to stress concentration

(C) It requires a smaller specimen size

(D) It can be performed without special equipment

146. In tunnel formwork systems, what is the main purpose of using hydraulic jacking?

(A) To reduce the weight of formwork

(B) To prevent concrete shrinkage cracks

(C) To achieve rapid cycling of formwork

(D) To improve bond strength with reinforcement

147. The lateral pressure exerted by fresh concrete on vertical formwork is highest in which of the following conditions?

(A) When the pour rate is slow

(B) When using high slump concrete

(C) When the ambient temperature is high

(D) When using large aggregate size

148. Which of the following dewatering techniques is most effective in sandy soils with high permeability?

(A) Wellpoint system

(B) Electro-osmosis

(C) Cement grouting

(D) Sump pumping

149. In a deep excavation site, the groundwater level is lowered by using deep wells. Which of the following factors most significantly affects the drawdown efficiency?

(A) Depth of excavation

(B) Diameter of the well

(C) Type of concrete used in foundations

(D) Permeability of the soil

150. Which of the following types of cofferdams is best suited for deep water construction with strong currents?

(A) Earthen cofferdam

(B) Cellular cofferdam

(C) Single-walled sheet pile cofferdam

(D) Rock-fill cofferdam

151. In a staircase, if the going is increased while keeping the total height constant, the result will be

(A) Increased number of risers

(B) No change in the number of risers

(C) Decreased number of risers

(D) Increased angle of inclination

152. The term "mullion" in a window refers to

(A) A vertical member dividing window sections

(B) A horizontal bar separating the glass panes

(C) The outer frame of a window

(D) A mechanism for opening and closing the window

153. The term "bubble diagram" in functional planning refers to

(A) A structural analysis tool

(B) A graphical representation of space relationships in a building

(C) A method to calculate ventilation requirements

(D) A technique for determining the structural load distribution

154. The primary objective of the 'Incremental Housing Strategy' in low-cost housing is

(A) To provide basic structural elements that allow future expansion

(B) To construct fully finished houses for occupants

(C) To implement luxury housing at low cost

(D) To maximize the use of conventional materials

155. The primary reason for using filler slabs in low-cost housing is
(A) To reduce the weight of the roof and decrease material consumption
(B) To improve the aesthetic appearance of the building
(C) To increase the structural strength of the roof
(D) To enhance the thermal conductivity of the slab

156. The term 'prospect' in building design relates to
(A) The durability of construction materials
(B) The future expansion capability of the structure
(C) The visual and aesthetic appeal of the surroundings from inside the building
(D) The economic feasibility of construction

157. Which type of stone masonry consists of roughly-shaped stones with large joints filled with mortar?
(A) Ashlar masonry
(B) Random rubble masonry
(C) Coursed rubble masonry
(D) Polygonal masonry

158. The weakest type of bond in brick masonry is
(A) English bond
(B) Header bond
(C) Flemish bond
(D) Stretcher bond

159. The floor area ratio in estimation is defined as
(A) The ratio of built-up area to plot area
(B) The ratio of plinth area to total floor area
(C) The ratio of open space to built-up space
(D) The ratio of carpet area to super built-up area

160. Which method is commonly used for estimating the cost of irregularly-shaped plots?
(A) Plinth area method
(B) Centre-line method
(C) Graphical method
(D) Cross-section method

161. The standard deduction for plastering openings (doors, windows) exceeding 3 m^2 in area is
(A) No deduction
(B) Full deduction of the opening area
(C) 25% deduction for the total opening
(D) 50% deduction for jambs, sills and soffits

162. In contract management, liquidated damages refer to

(A) Compensation payable by the contractor for delays or defects

(B) A discount given for early project completion

(C) The amount paid for contract cancellation

(D) Payment made to subcontractors for additional work

163. High-density concrete is commonly used for

(A) Residential Buildings

(B) Seismic-resistant structures

(C) Radiation shielding in nuclear plants

(D) Flexible pavements

164. The most suitable method for scheduling repetitive construction activities, such as road construction is

(A) Critical Path Method (CPM)

(B) Program Evaluation and Review Technique (PERT)

(C) Line of Balance (LOB)

(D) Bar Chart

165. Kaplan turbines are best suited for

(A) Medium head, medium discharge

(B) High head, low discharge

(C) Low head, high discharge

(D) Cavitation prevention

166. The Gross Command Area (GCA) of an irrigation project is

(A) The total area under the command including cultivable and uncultivable

(B) The area that can actually be irrigated

(C) The cultivated area in a basin

(D) The area prone to flooding

167. The duty of a canal system in irrigation engineering is measured as

(A) Cubic meters per hectare

(B) Hectares per cubic meter of water

(C) Liters per hectare

(D) Water depth in meters

168. In the estimation of length of valley curve, the height of headlight above road surface is assumed to be

(A) 0.15 m
(B) 0.50 m
(C) 0.75 m
(D) 1.0 m

169. A vehicle is moving on a highway at a speed of 6 m/sec. The coefficient of friction between the road surface and the tyres is 0.40 and the reaction time of the driver is 2.5 sec. Estimate the braking distance. Assume g = 10 m/sec^2.

(A) 3.9 m
(B) 4.2 m
(C) 4.5 m
(D) 4.8 m

170. The unit weight of the concrete is 2500 kg/m^3. The spacing between the contraction joint for plain cement concrete slab is 4.27 m. The coefficient of friction is 1.5. Estimate the allowable stress in tension in cement concrete.

(A) 0.78 kg/cm^2
(B) 0.80 kg/cm^2
(C) 0.82 kg/cm^2
(D) 0.84 kg/cm^2

171. The length of safe overtaking sight distance for one-way traffic road is 100 m. Estimate the minimum length of overtaking zone for the one-way traffic road.

(A) 500 m
(B) 400 m
(C) 300 m
(D) 200 m

172. Which of the following layer in rigid pavement is used as drainage layer?

(A) Sub-base layer
(B) PQC layer
(C) Subgrade
(D) Dry lean concrete layer

173. Spot speed of vehicles observed at a point on a highway are 50, 60, 70 and 80 km/h. What will be time mean speed of observed vehicles?

(A) 55 km/h
(B) 60 km/h
(C) 65 km/h
(D) 75 km/h

174. A cement concrete pavement has two lanes of 7.2 m with a joint. The area of steel per meter of longitudinal joint is 1.8 cm^2/m. The value of allowable working stress in tension is 1800 kg/cm^2. Assume unit weight of concrete = 2400 kg/m^3 and coefficient of friction = 1.5. Estimate the thickness of the cement concrete pavement.

(A) 22 cm
(B) 23 cm
(C) 24 cm
(D) 25 cm

175. The value of allowable working stress in tension and allowable bond stress in deformed bars in concrete is 1400 kg/cm^2 and 25 kg/cm^2 respectively. Assume the diameter of tie bar as 10 mm. Estimate the length of the tie bar.

(A) 14 cm
(B) 140 cm
(C) 28 cm
(D) 280 cm

176. According to IS 456, minimum grade of reinforced concrete for "Severe" exposure condition is

(A) M20 (B) M25

(C) M30 (D) M35

177. The radius of a horizontal circular curve is 100 meters. The design speed is 50 kmph. The coefficient of friction needed if no super elevation is provided will be about

(A) 0.404 (B) 0.502

(C) 0.197 (D) 0.355

178. The width of expansion joint gap is 2.5 cm in a cement concrete pavement. If the laying temperature is 4°C and the maximum slab temperature in summer reaches to 54°C, then the spacing between expansion joints will be (Assuming coefficient of thermal expansion of concrete as 10×10^{-6} per °C)

(A) 20 m (B) 25 m

(C) 30 m (D) 35 m

179. The number of vehicles occupying a unit length of a lane of roadway at a given instant is known as

(A) Traffic volume (B) Traffic capacity

(C) Basic capacity (D) Traffic density

180. Traffic benefit ratio, also known as traffic improvement factor compares the

(A) Performance of a road section before widening and after widening with higher traffic density

(B) Performance of a pavement cross-section with a geo-textile reinforced base course to similar cross section without geo-textile reinforcement, based on the number of cycles to failure

(C) Performance of the road section with isolated fixed time signal to traffic actuated (automatic) signal

(D) None of the above

181. Permittivity of the geo-textile is measured in

(A) m/sec (B) m^3/sec

(C) s^{-1} (D) cusecs

182. Quantity of excavation of a trapezoidal trench having bottom width of 3.0 m, side slopes of 1:2 (V:H), 2 m depth and 5.0 m length would be

(A) 70 m^3 (B) 85 m^3

(C) 65 m^3 (D) 90 m^3

183. End bearing piles supports the load

(A) Primarily by resistance developed at the pile tip or base

(B) Primarily by friction along its surface

(C) Primarily by self-weight of the pile

(D) None of the above

184. A circular ground having diameter of 70 m is to be protected by peripheral fencing. Market rate of fencing is Rs. 1000/ Rmt. Total cost of fencing would be

(A) Rs. 2,30,000
(B) Rs. 2,20,000
(C) Rs. 2,10,000
(D) Rs. 2,50,000

185. For the wooden door frame, 12 pieces wood, each having 7′ length and size of 4″ × 3″ are required. Market rates of wood is Rs. 3000/cuft. Total cost of wood would be

(A) Rs. 27,000
(B) Rs. 18,000
(C) Rs. 21,000
(D) Rs. 24,000

186. For the passenger lift with 13 person capacity, load would be

(A) 975 kg
(B) 910 kg
(C) 884 kg
(D) 845 kg

187. In a canal, discharge at the rate of 1 cumec is flowing for the whole day, which will be equal to

(A) 864 hectare meter
(B) 86400 hectare meter
(C) 86.4 hectare meter
(D) 8.64 hectare meter

188. For a two-lane concrete road, having width of 7 m, a straight-line camber in 1 in 72 is provided. Height of center of pavement (Crown) about the edge would be

(A) 7.2 cm
(B) 4.85 cm
(C) 3.6 cm
(D) 5 cm

189. In one type of concrete, the permissible compressive stress due to bending is 7 N/mm^2. The modular ratio 'm' is

(A) 18.66
(B) 13.33
(C) 10.58
(D) 9.33

190. Short term static modulus of elasticity (in N/mm^2) for the concrete having characteristics cube, compressive strength of 25 N/mm^2 would be

(A) 25000
(B) 3.5
(C) 25
(D) 5000

191. _____ is one of the important minerals present in bentonite.

(A) Feldspar
(B) Montmorillonite
(C) Calcium
(D) Sulphur

192. _____ is generally used to test viscosity of freshly-prepared bentonite slurry for using it in diaphragm wall construction.

(A) Marsh cone

(B) Sieve analysis

(C) Slump test

(D) None of the above

193. Section modulus of circular section having diameter of 7 cm would be

(A) 343 cm^3 (B) 336.8 cm^3

(C) 33.68 cm^3 (D) 154 cm^3

194. Void ratio of a soil whose porosity is 32%

(A) 0.322 (B) 0.680

(C) 0.471 (D) 0.755

195. A pump having the flow rate of 0.01 m^3/sec, head of 10 m, fluid density of 1000 kg/m^3, power required in kW is

(A) 9.81 (B) 0.981

(C) 98.1 (D) 0.098

196. According to IS 4985, for unplasticized PVC pipes for potable water supply, working pressure for class-3 pipe is

(A) 0.25 MPa (B) 0.30 MPa

(C) 0.40 MPa (D) 0.60 MPa

197. Damage caused by repeated fluctuations of stress, leading to progressive cracking of a structural element is known as

(A) Fatigue

(B) Brittle effect

(C) Creeping

(D) None of the above

198. According to IS 1786 for Fe 415 strength grade of the reinforcement, 415 indicates

(A) Tensile strength in N/mm^2

(B) Minimum 0.2% proof stress or yield stress in N/mm^2

(C) Compressive strength in N/mm^2

(D) None of the above

199. Cofferdams are constructed to

(A) Storage of water

(B) Recharge of ground water

(C) Create a reasonable working area by excluding water

(D) None of the above

200. The unit Lugeon represents

(A) Hydraulic conductivity of the rock mass

(B) Drilling resistance for the rock mass

(C) Pump efficiency

(D) Quality of water

SPACE FOR ROUGH WORK