10/09/2023

AM/APDCL/II/23

ASKED TO DO SO

Series

A

TEST BOOKLET
Paper—I
(CIVIL ENGINEERING)

01825

Time Allowed : 2 Hours   **Full Marks : 150**

Read the following instructions carefully before you begin to answer the questions :

1. The name of the Subject, Roll Number as mentioned in the Admission Certificate, Test Booklet No. and Series are to be written legibly and correctly in the space provided on the Answer-Sheet with Black/Blue ballpoint pen.

2. **Answer-Sheet without marking Series as mentioned above in the space provided for in the Answer-Sheet shall not be evaluated.**

3. All questions carry equal marks.
   The Answer-Sheet should be submitted to the Invigilator.

   Directions for giving the answers : Directions for answering questions have already been issued to the respective candidates in the 'Instructions for marking in the OMR Answer-Sheet' along with the Admit Card and Specimen Copy of the OMR Answer-Sheet.

   Example :

   Suppose the following question is asked :
   The capital of Bangladesh is
   (A) Chennai
   (B) London
   (C) Dhaka
   (D) Dhubri

   You will have four alternatives in the Answer-Sheet for your response corresponding to each question of the Test Booklet as below :

   Ⓐ Ⓑ Ⓒ Ⓓ

   In the above illustration, if your chosen response is alternative (C), i.e., Dhaka, then the same should be marked on the Answer-Sheet by blackening the relevant circle with a Black/Blue ballpoint pen only as below :

   Ⓐ Ⓑ ● Ⓓ

   The example shown above is the only correct method of answering.

4. Use of eraser, blade, chemical whitener fluid to rectify any response is prohibited.

5. Please ensure that the Test Booklet has the required number of pages (20) and 100 questions immediately after opening the Booklet. In case of any discrepancy, please report the same to the Invigilator.

6. No candidate shall be admitted to the Examination Hall/Room 20 minutes after the commencement of the examination.

7. No candidate shall leave the Examination Hall/Room without prior permission of the Supervisor/Invigilator. No candidate shall be permitted to hand over his/her Answer-Sheet and leave the Examination Hall/Room before expiry of the full time allotted for each paper.

8. No Mobile Phone, Electronic Communication Device, etc., are allowed to be carried inside the Examination Hall/Room by the candidates. Any Mobile Phone, Electronic Communication Device, etc., found in possession of the candidate inside the Examination Hall/Room, even if on off mode, shall be liable for confiscation.

9. No candidate shall have in his/her possession inside the Examination Hall/Room any book, notebook or loose paper, except his/her Admission Certificate and other connected papers permitted by the Commission.

10. Complete silence must be observed in the Examination Hall/Room. No candidate shall copy from the paper of any other candidate, or permit his/her own paper to be copied, or give, or attempt to give, or obtain, or attempt to obtain irregular assistance of any kind.

11. This Test Booklet can be carried with you after answering the questions in the prescribed Answer-Sheet.

12. Noncompliance with any of the above instructions will render a candidate liable to penalty as may be deemed fit.

13. No rough work is to be done on the OMR Answer-Sheet. You can do the rough work on the space provided in the Test Booklet.

N.B. : There will be negative marking @ 0·25 per 1 (one) mark against each wrong answer.

/128-A   [No. of Questions : 100]

SEAL

1. The maximum value of $\left(\dfrac{1}{x}\right)^x$ is

   (A) $\dfrac{1}{e}$

   (B) e^{e-1}

   (C) e^e

   (D) $\left(\dfrac{1}{e}\right)^e$

2. The solution of the ODE

   $$\dfrac{d^2y}{dx^2} - 2\dfrac{dy}{dx} + 2y = e^x \sin x \text{ is}$$

   (A) $e^x(c_1 \cos x + c_2 \sin x) - \dfrac{x}{2}e^x \cos x$

   (B) $e^x[c_1 \cos x + c_2 \sin x] + \dfrac{x}{2}e^x \cos x$

   (C) $e^x[c_1 \cos x + c_2 \sin x] - \dfrac{x}{2}e^x \sin x$

   (D) $e^x[c_1 \cos x + c_2 \sin x] + \dfrac{x}{2}e^x \sin x$

3. The regression coefficients of y on x and x on y respectively in a regression line are

   (A) dependent on both origin and scale

   (B) dependent on origin but not on scale

   (C) independent of both origin and scale

   (D) independent of origin but not of scale

4. For what value of n, the system of equations given below is inconsistent?

   $$x + y + z = 1$$
   $$x + 2y + 4z = n$$
   $$x + 4y + 10z = n^2$$

   (A) $n = 1,\ n = 2$

   (B) $n \neq 1$

   (C) $n \neq 2$

   (D) $n \neq 1,\ n \neq 2$

5. The volume of the solid bounded by the sphere $x^2 + y^2 + z^2 = 4$ and the surface of the paraboloid $x^2 + y^2 = 3z$ is

   (A) $\dfrac{19\pi}{12}$

   (B) $\dfrac{19\pi}{8}$

   (C) $\dfrac{19\pi}{6}$

   (D) $\dfrac{19\pi}{4}$

6. The sum and product of the eigenvalues of

$$\begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix}$$

are

(A) 7, 3

(B) 5, 12

(C) 5, 5

(D) 7, 5

7. The linear system of equations is given as $AX = B$, where A is the coefficient matrix, B is the constant matrix, and X is the variable matrix. The system of equations will have an infinite number of solutions when

(A) rank $(A) >$ rank $(A : B)$

(B) rank $(A) <$ rank $(A : B)$

(C) rank $(A) =$ rank $(A : B) = n$

(D) rank $(A) =$ rank $(A : B) < n$

where n is the number of unknowns, and $A : B$ is the augmented matrix.

8. The maximum value of $f(x, y) = 49 - x^2 - y^2$ on the line $x + 3y = 10$ is

(A) 39

(B) 40

(C) 36

(D) 50

9. The probability that a leap year selected randomly has 53 Tuesdays is

(A) $\dfrac{1}{7}$

(B) $\dfrac{2}{7}$

(C) $\dfrac{3}{7}$

(D) 0

10. The integrating factor of the Leibnitz's linear differential equation $ydx - (x + 2y^3)dy = 0$ is

(A) $\dfrac{1}{y}$

(B) $\dfrac{1}{x}$

(C) x

(D) y

11. Pure bending moment is created in a simply supported beam with

(A) one-point loading

(B) two-point loading

(C) three-point loading

(D) None of the above

12. A simply supported beam of span 5 m has an overhang of 1 m at one end. The beam carries a u.d.l. of 10 kN/m along the entire length. The maximum bending moment at the 5 m span is

(A) 31·25 kNm

(B) 26·25 kNm

(C) 5 kNm

(D) None of the above

13. The moment of inertia of an isosceles triangle about its centre of gravity is $\frac{bh^3}{36}$, where b is base and h is height of the triangle. For the same triangle, the moment of inertia about its base is

(A) $\frac{bh^4}{108}$

(B) $\frac{bh^3}{18}$

(C) $\frac{bh^3}{10}$

(D) None of the above

14. A concrete gravity dam stands for height of 100 m. With increase of impounded water level

(A) only compressive stress increases at base

(B) only tensile stresses increase at base

(C) both compressive and tensile stresses increase at base

(D) Nature of stress depends on the water level

15. A concrete column of section size 400 mm × 400 mm is subjected to axial force at eccentricities e_x = 75 mm and e_y = 65 mm. Which one of the following statements is true?

(A) No tension is developed anywhere in the section.

(B) Tension develops in the section.

(C) Eccentricities lie on neutral axis.

(D) Data insufficient to comment.

16. An RC cantilever beam was found to develop distress at fixed end. As protection, a prop was introduced at the free end. Your comment is

(A) the proposition is wrong as it will enhance cracks at the bottom

(B) the proposition is wrong as it will enhance cracks at the top

(C) the proposition is right but it needs further retrofitting

(D) the proposition is right and it will protect the beam

17. The bending moment diagram for a beam is of rectangular shape. It is a

(A) cantilever beam with end couple

(B) propped cantilever with uniformly distributed load

(C) fixed beam with uniformly distributed load

(D) None of the above

18. Two materials A and B are tested in tension. The initial straight parts of the stress-strain curves are inclined at 70 degrees and 80 degrees with horizontal for A and B, respectively. The ratio of modulus of elasticity of A and B (i.e., E_A/E_B) is

(A) 0·48

(B) 0·58

(C) 0·78

(D) 0·88

19. Select the correct statement.
The degree of freedom at a node for

(A) 2D truss is 3, and 3D beam is 6

(B) 3D truss is 6, and 2D beam is 2

(C) 2D truss is 2, and 3D beam is 6

(D) 3D truss is 4, and 2D beam is 3

20. A weight of 100 kN is allowed to hang through two identical ropes placed symmetrically about the vertical. The angle between the ropes is 100 degrees. The tension in each rope is

(A) 50·8 kN

(B) 77·8 kN

(C) 100·8 kN

(D) 123·8 kN

21. A simply supported beam of length L has a cross-sectional depth d and width $\dfrac{d}{2}$. If the beam is loaded with a uniformly distributed load of w/unit length, then the maximum deflection is

(A) $\dfrac{5}{384}\dfrac{wL^4}{Ed^4}$

(B) $\dfrac{5}{16}\dfrac{wL^4}{Ed^4}$

(C) $\dfrac{5}{8}\dfrac{wL^3}{Ed^4}$

(D) $\dfrac{5}{16}\dfrac{wL^3}{Ed^4}$

22. Flexural tensile strength of M25 concrete as per IS456:2000 is

(A) 12·5 N/mm^2

(B) 25 N/mm^2

(C) 22·5 N/mm^2

(D) 3·5 N/mm^2

23. A cable carrying a load of 40 kN/m run of horizontal span is stretched between supports 150 m apart. The supports are at same level and the central dip is 15 m. The greatest and least tensions in the cable are
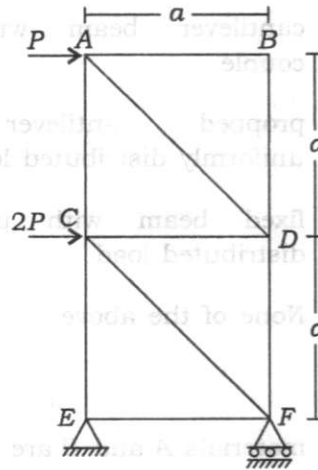
(A)   8077 kN and 7500 kN

(B)   10000 kN and 7500 kN

(C)   9500 kN and 6000 kN

(D)   None of the above

24. In the portal frame shown in the given figure, the ratio of sway moments in columns AB and CD will be equal to
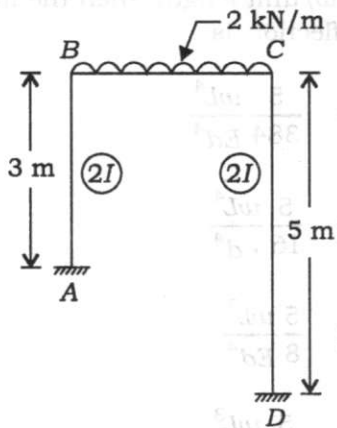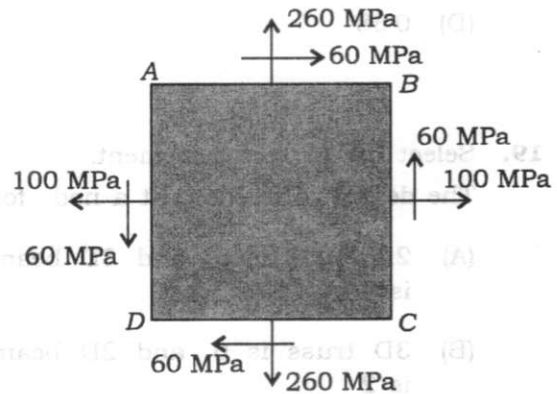

(A) $\dfrac{25}{9}$

(B) $\dfrac{3}{5}$

(C) $\dfrac{2}{3}$

(D) $\dfrac{15}{8}$

25. The force in member CD of the truss is

(A)   zero

(B)   2p

(C)   p (compression)

(D)   p (tensile)

26. The state of stress at a point in a stressed body is shown in the figure. The radius of the Mohr's circle representing the state of stress is

(A)   60 MPa

(B)   80 MPa

(C)   120 MPa

(D)   100 MPa

27. A client comes to your testing laboratory with three 15 cm concrete cubes of M30 grade (standard deviation 7 MPa). The compressive strength obtained in the laboratory test is 32.5 MPa. Following IS code provisions, you shall

   (A) accept the result

   (B) reject the result

   (C) carry out mix design to verify strength

   (D) suspend declaring the result

28. The modern softwares analyze frame structures using

   (A) moment distribution method

   (B) stiffness matrix method

   (C) slope deflection method

   (D) variational principle

29. The term 'virtual work' refers to

   (A) virtual work done by real forces

   (B) virtual work done by virtual forces

   (C) real work done by real forces

   (D) real work done by virtual forces

30. Two plates 12 mm and 20 mm thick are to be joined by a double cover butt joint with 8 mm thick packing plate. What will be the effect of packing on the design shear strength of bolt?

   (A) Decrease by 10%

   (B) Increase by 10%

   (C) Decrease by 15%

   (D) Increase by 15%

31. For a rectangular beam, the shape factor is 1.5. The factor of safety in bending is 1.5. If the allowable stress is increased by 15% for wind and earthquake loads, then the load factor is

   (A) 1.95

   (B) 1.40

   (C) 1.65

   (D) 1.80

32. Unfactored maximum bending moments at a section of a reinforced concrete beam resulting from a frame analysis are 330 kNm, 420 kNm and 150 kNm under dead load, live load and wind load respectively. The design moment as per IS456:2000 for the limit state of collapse is

   (A) 720 kNm

   (B) 840 kNm

   (C) 1125 kNm

   (D) 1530 kNm

33. A hall of 10 m × 24 m size consists of a number of beams 4 m centre to centre parallel to the shorter span of the hall. Width of web = 300 mm and thickness of slab is 120 mm. The beams are cast monolithic with the columns at their ends. The effective width of flange of an intermediate beam is

(A) 1·52 m

(B) 0·94 m

(C) 2·01 m

(D) 2·19 m

34. Consider the following statements :

I. Modulus of elasticity of concrete increases with increase in compressive strength of concrete.

II. Brittleness of concrete increases with decrease in compressive strength of concrete.

III. Shear strength of concrete increases with increase in compressive strength of concrete.

The true statements are

(A) I and II

(B) I, II and III

(C) II and III

(D) I and III

35. Consider the following statements :

I. Nominal maximum size of coarse aggregate to be used in RCC is 20 mm.

II. As per IS456:2000, fine sand to be used in RCC should conform to zone II or zone III.

III. Minimum grade of concrete to be used in RCC is M30.

The true statements are

(A) I and II

(B) I and III

(C) I, II and III

(D) II and III

36. The pozzolanas added to improve the properties of concrete are

(A) fly ash

(B) silica fume

(C) slag

(D) All of the above

37. Sand bath method is used to determine

(A) specific gravity

(B) unit weight

(C) moisture content

(D) particle size distribution

38. The number of blows observed in a standard penetration test for different penetration depths are given as follows :

Penetration of sampler	Number of blows
0 mm–100 mm	2
100 mm–200 mm	4
200 mm–350 mm	7
350 mm–400 mm	10

The observed N value is

(A) 21

(B) 22

(C) 17

(D) 16

39. A 50 kN load acts on the surface of an infinite elastic medium. The vertical pressure intensity in kN/m^2 at 10 m below and 4 m away from the load will be

(A) $0·048 \ kN/m^2$

(B) $0·096 \ kN/m^2$

(C) $0·049 \ kN/m^2$

(D) $0·035 \ kN/m^2$

40. A cohesive soil yields a maximum dry density of 1·4 gm/cc at OMC of 16% during a standard Proctor test. If the value of $G = 2·65$, then the degree of saturation of the soil is

(A) 1·23

(B) 1·86

(C) 1·43

(D) 1·69

41. Match List—I (Roller type) with List—II (Soil type) :

List—I	List—II
a. Sheep foot roller	1. Gravel in WBM road
b. Preumatic roller	2. Dry sand
c. Smooth heavy roller	3. Core of earthen dam
d. Vibratory roller	4. Casing of earthen dam

(A) a b c d
     2 3 1 4

(B) a b c d
     3 4 1 2

(C) a b c d
     4 3 1 2

(D) a b c d
     4 3 2 1

42. For the sampler shown in the figure, area ratio, inside clearance and outside clearance are respectively
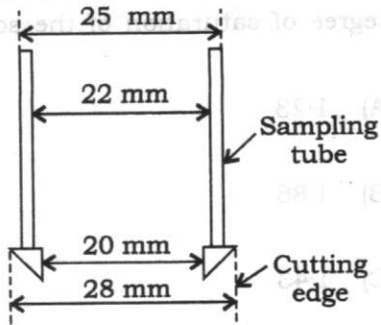
- (A) 96%, 12%, 10%
- (B) 49%, 11%, 9%
- (C) 49%, 9%, 11%
- (D) 96%, 10%, 12%

43. The cohesion and density of a soil are $4t/m^2$ and $8t/m^2$ respectively. For a factor of safety of 2 and stability number 0.1, the safe height of slope is

- (A) 5 m
- (B) 50 m
- (C) 25 m
- (D) 2·5 m

44. Which one of the following factors does **not** affect the permeability of the soil?

- (A) Voids ratio
- (B) Absorbed water
- (C) Entrapped air
- (D) Height of soil layer

45. If D indicates diameter of grain of soil and K indicates permeability of soil, then which of the following is true?

- (A) $K \propto D$
- (B) $K \propto D^2$
- (C) $K \propto D^3$
- (D) None of the above

46. An oven dried sample of soil weighs 250 gm. The pycnometer with the sample and water weighs 1650 gm. The pycnometer filled with only water weighs 1490 gm. The specific gravity of the soil is

- (A) 2·62
- (B) 2·63
- (C) 2·70
- (D) 2·75

47. The failure of earthen dam may take place under

- (A) high lateral pressure
- (B) high exit gradient
- (C) low coefficient of permeability
- (D) low voids ratio

48. The equation

$$\sigma_z = \frac{3Q}{2\pi Z^2}\left[\frac{1}{1+\left(\frac{r}{Z}\right)^2}\right]^{2.5}$$

with usual notation in geotechnical engineering is

(A) Terzaghi's equation

(B) Boussinesq's equation

(C) Meyerhof's equation

(D) None of the above

49. The maximum area that can be irrigated with supply discharge of 0·04 cumec, the infiltration capacity of the soil being 10 cm/hour, is

(A) 1·44 ha

(B) 144 ha

(C) 0·144 ha

(D) None of the above

50. A certain crop in Assam requires 110 days to raise (base period). The valid relationship between delta and duty of crop can be given as

(A) duty × delta = 650·4

(B) duty × delta = 750·4

(C) duty × delta = 850·4

(D) duty × delta = 950·4

51. The CG of a semicircular area of radius r, from its base is at a distance of

(A) $\dfrac{3r}{4\pi}$

(B) $\dfrac{4r}{3\pi}$

(C) $\dfrac{4\pi}{3r}$

(D) $\dfrac{3\pi}{4r}$

52. The force of friction always acts in a direction opposite to that

(A) in which the body tends to move

(B) in which the body is moving

(C) Both (A) and (B)

(D) None of the above

53. Take n as number of members and j as number of joints. A two-dimensional frame is said to be perfect when

(A) $n > (2j - 3)$

(B) $n = 2j - 3$

(C) $n < (2j - 3)$

(D) $n \gg (2j - 3)$

54. A rectangular plate of size 2·5 m by 4·0 m is put under water vertically with top edge 2 m below the water surface. The force exerted on the vertical surface is

(A) 392·4 kN

(B) 385·4 kN

(C) 375·4 kN

(D) 365·4 kN

55. Two forces P and Q pass through a common origin and the angle between them is θ. If α is the angle the resultant of the two forces makes with the force P, then the valid relationship is

(A) $\tan\alpha = \dfrac{P\sin\theta}{P + Q\cos\theta}$

(B) $\tan\alpha = \dfrac{Q\sin\theta}{P + Q\cos\theta}$

(C) $\tan\alpha = \dfrac{P\cos\theta}{P + Q\sin\theta}$

(D) $\tan\alpha = \dfrac{Q\cos\theta}{P + Q\sin\theta}$

56. Differential pressure head measured by a mercury oil differential manometer is 9·5 m of oil. If the specific gravity of oil is 0·68, then the difference in level of mercury is

(A) 300 mm

(B) 400 mm

(C) 500 mm

(D) 600 mm

57. A hydraulic turbine develops 1000 kW power for a head of 40 m. If the turbine is to work under a head of 20 m, then the power developed in kW is

(A) 250

(B) 500

(C) $\dfrac{500}{\sqrt{8}}$

(D) $\dfrac{1000}{\sqrt{8}}$

58. A clay test specimen of 25 mm thickness under double drainage condition attained 50% of primary consolidation in 50 minutes. How long will it take for the same clay layer of 10 m thickness to reach the same degree of consolidation under the condition that clay is drained on the top surface only?

(A) 15·4 years

(B) 61·7 years

(C) 85·6 years

(D) None of the above

59. A closed contour line with one or more higher contour lines inside represents

(A) cliff

(B) hill

(C) valley

(D) cave

60. In surveyor's compass, the graduation is in

(A) whole-circle bearing

(B) quadrantal bearing

(C) both whole-circle and quadrantal bearings

(D) None of the above

61. The whole-circle bearing of S 31° 36′ E is

(A) 138° 24′

(B) 158° 24′

(C) 128° 24′

(D) 148° 24′

62. A line lying throughout the surface of the ground and preserving a constant inclination to the horizontal is

(A) contour gradient

(B) horizontal equivalent

(C) contour interval

(D) vertical control

63. A surveyor measured the distance between two points on plan drawn to a scale of 1 cm = 30 m and the result was 500 m. Later it was discovered that 1 cm = 10 m scale was used. The true distance between the two points would be

(A) 168·3 m

(B) 165·6 m

(C) 162·3 m

(D) 166·6 m

64. The benchmark with reduced level (RL) = 156·305 m has been established at the floor of a room. It is required to find the RL of the underside of roof. Backsight (BS) is 1·8 m whereas foresight (FS) is 0·675 m. The RL will be

(A) 152·3 m

(B) 159·8 m

(C) 158·7 m

(D) 153·3 m

65. Temporary adjustment of a theodolite involves

(A) setting up, levelling up and elimination of parallax

(B) settling down, levelling down and elimination of parallax

(C) screwing, bubbling and elimination of azimuth

(D) None of the above

66. The variation of magnetic declination may be

(A) diurnal and nocturnal

(B) diurnal and annual

(C) diurnal and religious

(D) nocturnal and secular

67. The forebearing of a line is 215 degrees. The back bearing of the line is

(A) 30 degrees

(B) 35 degrees

(C) 395 degrees

(D) Data insufficient to answer

68. The correction for curvature in surveying for a distance of 1100 m is

(A) 0·115 m

(B) 0·095 m

(C) 0·085 m

(D) 0·075 m

69. In a survey, the RL of BM is 100·230. The backsight is 1·512 and foresight is 0·967. The height of instrument is

(A) 101·742

(B) 98·718

(C) 101·967

(D) 99·263

70. In a levelling exercise, which of the following rules is applicable (BS = backsight, FS = foresight and RL = reduced level)?

(A) ΣBS − ΣFS = last RL − first RL

(B) ΣFS − ΣBS = last RL − first RL

(C) ΣBS − ΣFS = first RL − last RL

(D) ΣBS − ΣFS = height of instrument

71. The radius of a horizontal curve is 150 m. If the design speed is 60 km/hour and if the friction is neglected, then the required superelevation is

(A) 0·177 m

(B) 0·189 m

(C) 0·191 m

(D) 0·211 m

72. Which transition curve in road you shall *not* recommend?

(A) Spiral

(B) Cubic parabola

(C) Circular

(D) Lemniscate

73. Given the speed of vehicle as V, the length of transition curve in road is proportional to

(A) V

(B) V^2

(C) V^3

(D) V^4

74. The ruling gradient, limiting gradient and exceptional gradient in plain road respectively are

(A) 1 in 30, 1 in 20 and 1 in 15

(B) 1 in 25, 1 in 15 and 1 in 10

(C) 1 in 20, 1 in 12 and 1 in 8

(D) None of the above

75. The most of Indian paved roads are

(A) flexible type

(B) rigid type

(C) bitumen

(D) earthen

76. Softening point test is related to

(A) aggregate

(B) sand

(C) bitumen

(D) sub-base material

77. Which test is most relevant in road construction?

(A) Aggregate crushing value test

(B) Aggregate impact value test

(C) Cube test

(D) Gradation test

78. In a road, the speed of vehicles is 60 km/hour. The average distance between vehicles is 10 m. The maximum basic capacity of the road is

(A) 4000 vehicles per hour

(B) 5000 vehicles per hour

(C) 6000 vehicles per hour

(D) None of the above

79. In tape measurement, the connections for pull, sag, temperature and slope are respectively

(A) additive/subtractive, subtractive, additive/subtractive and subtractive

(B) additive, additive, additive/subtractive and subtractive

(C) subtractive, additive, additive/subtractive and additive

(D) additive/subtractive, additive/subtractive, additive/subtractive and additive

80. Which of the following is *not* a feature of surveying telescope?

(A) Applanation

(B) Achromatism

(C) Declination

(D) Illumination

81. What is the deflection at the surface of flexible pavement due to a wheel load of 30 kN and a tyre pressure of 0·60 MPa? Take $E = 20$ MPa.

(A) 5·8 mm

(B) 5·6 mm

(C) 5·4 mm

(D) 5·2 mm

82. Using which parameters hydrographs are constructed?

(A) Stream discharge vs. time

(B) Time vs. area

(C) Distance vs. time

(D) Stream discharge vs. area

83. By which method, one can determine the average depth of rainfall over an area?

(A) Isogonal method

(B) Symon's method

(C) Arithmetic mean method

(D) All of the above

84. When discharge in a stream exceeds the capacity of a channel in a particular reach, the condition is called

(A) stream flow

(B) flood

(C) drought

(D) famine

85. Which of the following devices is used to measure potential evapotranspiration?

(A) Odometer

(B) Lysimeter

(C) Nephelometer

(D) None of the above

86. Bernoulli's equation is applied to

(A) venturimeter

(B) orificemeter

(C) pitot tube meter

(D) All of the above

87. Raindrops are spherical because of

(A) viscosity

(B) air resistance

(C) surface tension forces

(D) atmospheric pressure

88. Froude number is the ratio of

(A) inertial force to viscous force

(B) buoyancy force to viscous force

(C) buoyancy force to inertia force

(D) inertia force to gravity force

89. The maximum superelevation in hilly road should **not** exceed

(A) 7%

(B) 8%

(C) 9%

(D) 10%

90. Which Road Plan in India was the first attempt for the Road Development Programme between 1943–1963?

(A) Poona Road Plan

(B) Nagpur Road Plan

(C) Bombay Road Plan

(D) Lucknow Road Plan

91. A road sign indicates 'No Parking'. It is a/an

(A) warning sign

(B) cautionary sign

(C) mandatory sign

(D) informatory sign

92. Roadway width for National Highway and State Highway (two lanes) as per IRC is

(A) 7·5 m

(B) 10 m

(C) 12 m

(D) 15 m

93. The most common cause of acidity in water is

(A) oxygen

(B) nitrogen

(C) carbon dioxide

(D) hydrogen

94. Which one of the following does **not** help in disinfecting water?

(A) Filtration

(B) Chlorine tablets

(C) Alum

(D) Boiling

95. Zero hardness of water is achieved by

(A) lime soda process

(B) excess lime treatment

(C) ion exchange method

(D) using excess alum dosage

96. What is the degree of workability of concrete having a slump value of 100 mm–150 mm when placed in bored piling (as per IS456:2000)?

(A) Low

(B) Medium

(C) High

(D) Very high

97. The approximate ratio of ingredients for concrete of M20 grade is

(A) 1 : 1.5 : 3

(B) 1 : 2 : 4

(C) 1 : 3 : 6

(D) 1 : 4 : 8

98. Schmidt's rebound hammer test is used to determine in a concrete specimen

(A) tensile strength

(B) shrinkage limit

(C) crack depth

(D) surface hardness

99. As per IS456:2000, the standard deviation for M25 concrete is to be taken as

(A) 3.0

(B) 3.5

(C) 4.0

(D) 5.0

100. Which colour is used to illustrate actual progress in bar charts?

(A) Red

(B) Black

(C) Blue

(D) Green