AE0915 Test Booklet No. 2083585

CIVIL ENGINEERING

Paper-2

Series **A**

601

Duration : 150 Minutes ***Max. Marks : 150***

INSTRUCTIONS TO CANDIDATES

1. Please check the Test Booklet immediately on opening and ensure that it contains all the **150** multiple choice questions printed on it.
2. Separate Optical Mark Reader (OMR) Answer Sheet is supplied to you along with the Question Paper Booklet. The OMR Answer sheet consists of two copies i.e., the Original Copy (Top Sheet) and Duplicate Copy (Bottom Sheet). The OMR sheet contains Registered Number/Hall Ticket Number, Subject/Subject Code, Booklet Series, Name of the Examination Centre, Signature of the Candidate and Invigilator etc.
3. If there is any defect in the Question Paper Booklet or OMR Answer Sheet, please ask the invigilator for replacement.
4. Since the answer sheets are to be scanned (valued) with Optical Mark Scanner system, the candidates have to **USE BALL POINT PEN (BLUE/BLACK) ONLY** for filling the relevant blocks in the OMR Sheet including bubbling the answers. Bubbling with Pencil / Ink Pen/ Gel Pen is not permitted in the examination.
5. The Test Booklet is printed in four (4) Series, viz. A or B or C or D. The Series A or B or C or D is printed on the right-hand corner of the cover page of the Test Booklet. Mark your Test Booklet Series in Part C on side 1 of the Answer Sheet by darkening the appropriate circle with **Blue/Black Ball Point Pen**.

   Example to fill up the Booklet Series :

   If your Test Booklet Series is A, please fill as shown below :

   ● (B) (C) (D)

   If you have not marked the Test Booklet Series at Part C of side 1 of the Answer Sheet or marked in a way that it leads to discrepancy in determining the exact Test Booklet Series, then, in all such cases, your Answer Sheet will be invalidated without any further notice.
6. Each question is followed by 4 answer choices. Of these, you have to select one correct answer and mark it on the Answer Sheet by darkening the appropriate circle for the question. If more than one circle is darkened, the answer will not be valued at all. Use Blue/Black Ball Point Pen to make heavy black marks to fill the circle completely. Make **no** other stray marks.

   e.g. : If the answer for Question No. 1 is Answer choice (2), it should be marked as follows:

   1. (1) ● (3) (4)
7. Mark Paper Code and Roll No. as given in the Hall Ticket with Blue/Black Ball Point Pen by darkening appropriate circles in Part A of side 1 of the Answer Sheet. Incorrect/ not encoding will lead to ***invalidation*** of your Answer Sheet.

   Example: If the Paper Code is 601 and Roll No. is 1309102001, fill as shown below :

Paper Code

6	0	1
0	●	0
1	1	●
2	2	2
3	3	3
4	4	4
5	5	5
●	6	6
7	7	7
8	8	8
9	9	9

Registered Number/Hall Ticket Number

1	3	0	9	1	0	2	0	0	1
0	0	●	0	0	●	0	●	●	0
●	1	1	1	●	1	1	1	1	●
2	2	2	2	2	2	●	2	2	2
3	●	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	●	9	9	9	9	9	9

(Continued on back cover page.)

8. Please get the signature of the Invigilator affixed in the space provided in the Answer Sheet. An Answer Sheet without the signature of the Invigilator is liable for ***invalidation.*** Candidate should sign in the space provided on the OMR Answer Sheet.
9. Rough work should be done only in the space provided for that purpose in the Question Paper Booklet. No loose sheet of paper will be allowed into the Examination hall.
10. Do not mark answer choices on the Test Booklet. Violation of this will be viewed seriously.
11. In case of any discrepancy between English and Telugu Versions of the questions, English Version of the question shall be treated as final.
12. Use of Calculators, Mathematical Tables, Log Books, Pagers, Cell Phones or any other electronic gadgets is strictly prohibited.
13. The candidate should write the Question Paper Booklet Number and sign in the space provided in the Nominal Rolls while ensuring the Bio-data printed against his/her name is correct.
14. If the candidate notices any discrepancy printed on Hall tickets as to community, gender, date of birth etc., they may immediately bring to the notice of the Commission's officials/ Chief Superintendent in the examination centre and necessary corrections be made in the Nominal Roll, in the Examination Hall against his/her Hall Ticket Number for being verified by the Commission's Office.
15. The Commission would be analyzing the responses of a candidate with other appeared candidates to detect patterns of similarity. If it is suspected that the responses have been shared and the scores obtained are not genuine / valid, the Commission reserves the right to cancel his/her candidature and to invalidate the Answer Sheet.
16. (i) Whenever Written Examination is held, only those candidates who are totally blind are allowed to write the examination with the help of scribe and 20 minutes extra time is permitted to them per hour.
    (ii) An extra time of 20 minutes per hour is also permitted for the candidates with locomotor disability and CEREBRAL PALSY where dominant (writing) extremity is affected for the extent slowing the performance of function (Minimum of 40% impairment), scribe is allowed to such candidates.
    (iii) Scribe will be provided to those candidates who do not have both the upper limbs for Orthopedically handicapped. However, no extra time will be granted to them.
        (a) The scribe should be form an academic discipline other than that of the candidate and the academic qualification of the scribe should be one grade lower than the stipulated eligibility criteria.
        (b) The candidate as well as the scribe will have to give a suitable undertaking confirming the Rules applicable.
17. No candidate should leave the examination hall until completion of examination time.
18. Before leaving the examination hall, the candidate should handover the original OMR Answer Sheet (top sheet) to the Invigilator and carry the bottom sheet (duplicate) for his/her record, failing which action will be taken for malpractice.
19. The script will not be valued if the candidate :
    (i) Writes the Hall Ticket No. in any other place of OMR sheet, except in the space provided for the purpose.
    (ii) Writes irrelevant matter, including the religious symbols, words, prayers or any communication whatsoever, in any place of the OMR Answer Sheet.
    (iii) Uses other than Blue/Black Ball Point Pen to darken the circles.
    (iv) Forgetting to bubble the Test Booklet series or bubbling the other Test Booklet Series code than supplied to him/her.
    (v) Bubbling the circles incompletely or using ✓ or × or ⊙ in the circles.
    (vi) Using of whitener on the Answer Sheet is liable for invalidation of the candidature.
    (vii) If any type of tampering (rubbing the circles with chalk powder/scratching the circles with razors etc) is noticed will lead to invalidation of the candidature.
    (viii) Adopts any method of malpractice.
20. No correspondence will be entertained in this matter by the Commission, if the Answer Sheet of the candidate is invalidated/ rejected due to the above reasons.

CIVIL ENGINEERING

1. The working principle of the optical square is based on
   (1) Reflection (2) Refraction
   (3) Double reflection (4) Double refraction

2. If the magnetic bearing of a line is 48° 24′ and the magnetic declination is 5° 30′ East, then the true bearing is
   (1) 42° 54′ (2) 37° 24′ (3) 53° 54′ (4) 59° 24′

3. Setting out a simple curve by two theodolite method does not require
   (1) Angular measurements (2) Linear measurements
   (3) Both angular and linear measurements (4) Any measurement

4. Point of tangency is the
   (1) Beginning of the curve
   (2) End of the curve
   (3) Common point where the radius changes
   (4) Common point where the radius and direction changes

5. In chain surveying, field work is limited to
   (1) Linear measurements only
   (2) Both linear and angular measurements
   (3) Angular measurements only
   (4) Vertical measurements

6. The correction to be applied to each 30 m chain length along slope is
   (1) $30(1-\sec\alpha)$ m (2) $30(\sec\alpha-1)$ m (3) $30(1-\cos\alpha)$ m (4) $30(\cot\alpha-1)$ m

7. The correction for sag is
   (1) Always additive
   (2) Always negative
   (3) Always zero
   (4) Some times additive and some times negative

8. Which of the following error is not eliminated by the method of repetition for horizontal angle measurement ?
   (1) Error due to eccentricity of verniers
   (2) Error due to displacement of station signals
   (3) Error due to wrong adjustments of line and trunnion axis
   (4) Error due to inaccurate graduation

9. A triangle is said to be well conditioned when its angles lie between
   (1) 20° and 150° (2) 30° and 120° (3) 15° and 135° (4) 25° and 130°

10. Which of the following is not used in measuring perpendicular offsets ?
    (1) Line ranger (2) Tape (3) Optical square (4) Cross-staff

11. Le Chatelier apparatus is used to determine which of the following properties of cement ?
    (1) Soundness (2) Initial setting time
    (3) Fineness (4) Compressive strength

12. The carrier in case of distemper is
(1) Linseed oil (2) White lead (3) Poppy oil (4) Water

13. As per NBC 2005, institutional buildings comes under
(1) Group – A (2) Group – B (3) Group – C (4) Group – D

14. Queen post truss is suitable for spans up to
(1) 5 to 8 m (2) 12 m (3) 16 m (4) 24 m

15. Dressing of stone is done
(1) After seasoning (2) After quarrying
(3) Before use (4) Before seasoning

16. Low heat cement consists lower percentage of which of the following ?
(1) C_3A (2) C_3S (3) C_2S (4) C_4S

17. Which of the following paints recommended for use on stucco plaster, brick and masonry surface ?
(1) Enamel paints (2) Emulsion paints (3) Plastic paints (4) Oil paints

18. Gypsum is added to portland cement during its manufacturing so that it may
(1) Accelerate the setting time (2) Retard the setting time
(3) Decrease the burning temperature (4) Facilitate grinding

19. Smith's test is conducted on a sample of stone to find out which of the following parameter ?
(1) Compressive strength (2) Toughness
(3) Presence of soluble matter (4) Hardness

20. Presence of which of the following is responsible for imparting yellow tint to bricks ?
(1) Silica (2) Alumina (3) Lime (4) Magnesia

21. For a given system of coplanar concurrent forces, if $\Sigma Fx = -20$ N and $\Sigma Fy = -20$ N, then
(1) $R = -20\sqrt{2}$ N and $\alpha = 45°$ with east (2) $R = 20\sqrt{2}$ N and $\alpha = 135°$ with east
(3) $R = 20\sqrt{2}$ N and $\alpha = 225°$ with east (4) $R = -20\sqrt{2}$ N and $\alpha = 315°$ with east

22. Which of the following cases gives the least moment of inertia, in case of a square ?
(1) M.I. about the base side (2) M.I. about the top side
(3) M.I. about the diagonal (4) M.I. about one vertical side

23. In a triangular section of size 'b × h', if width is reduced to half and height is doubled, then its I_{XX} is increased by
(1) 2 times (2) 4 times (3) 8 times (4) 16 times

24. A structural member is generally designed so that the material is stressed to
(1) Yield stress (2) Ultimate stress
(3) Breaking stress (4) Working stress

25. In an RCC column, if $A_s = 1000$ mm^2, $A_c = 10000$ mm^2, $\sigma_c = 5$N/mm^2 and m = 20, then load on the column is
(1) 75 kN (2) 145 kN (3) 150 kN (4) 1005 kN

26. If σ and E for a body of volume 2×10^5 mm^3 are 10 N/mm^2 and 1×10^5 N/mm^2, Resilience of the body is

(1) 10 N mm (2) 20 N mm (3) 100 N mm (4) 200 N mm

27. If a simply supported beam of 5 m span carries a point load of 100 kN at 2 m from LHS, the maximum bending moment on it is

(1) 62.5 kN m (2) 120 kN m (3) 125 kN m (4) 312.5 kN m

28. For a solid circular beam of 40 mm dia, the section modulus is

(1) $\pi \times 10^3$ mm^3 (2) $2\pi \times 10^3$ mm^3 (3) $4\pi \times 10^3$ mm^3 (4) $8\pi \times 10^3$ mm^3

29. If maximum slope of a simply supported beam of span 'L' with midpoint load is 1°, then maximum deflection is

(1) $\pi L/240$ (2) $\pi L/270$ (3) $\pi L/540$ (4) $\pi L/576$

30. Moment area method can be easily adopted for the following case :

(1) Simply supported beam with eccentric point load
(2) Simply supported beam with point loads & UDL
(3) Simply supported beam with two symmetrically placed unequal point loads
(4) Cantilever with point loads and UDL

31. The resultant of two collinear forces P and Q, which are acting in opposite direction is

(1) P + Q (2) P – Q (3) $\sqrt{P^2 + Q^2}$ (4) $\sqrt{P^2 - Q^2}$

32. The force system that is applied to open a bottle cap is called

(1) Collinear forces (2) Like parallel forces
(3) Unlike parallel forces (4) Couple

33. In a circular section of diameter D, if 'D' is doubled, then its polar M.I. will be increased by

(1) 4 times (2) 8 times (3) 16 times (4) 32 times

34. In case of a stepped bar of a material subjected to an axial load, the total elongation is proportional to

(1) P/E (2) $[I_1 + I_2 + \ldots\ldots + I_n]$

(3) $[\frac{1}{A_1} + \frac{1}{A_2} + \ldots\ldots + \frac{1}{A_n}]$ (4) $[\frac{I_1}{A_1} + \frac{I_2}{A_2} + \ldots\ldots + \frac{I_n}{A_n}]$

35. The unit for modulus of resilience is

(1) Joule (2) Joules/mm (3) Joules/mm^2 (4) Joules/mm^3

36. Variation of bending moment under a UDL, in a beam is

(1) Straight line variation (2) Parabolic variation
(3) Cubic variation (4) Zero i.e. horizontal straight line

37. In case of an I-beam, major percentage of the shear force at a section is resisted by

(1) Top flange (2) Bottom flange
(3) Top and bottom flanges together (4) Web

38. Maximum deflection in a simply supported beam subjected to pure bending is given by

(1) $\delta = \frac{ML}{2EI}$ (2) $\delta = \frac{ML^2}{8EI}$ (3) $\delta = \frac{ML^2}{12EI}$ (4) $\delta = \frac{5}{48}\frac{ML^2}{EI}$

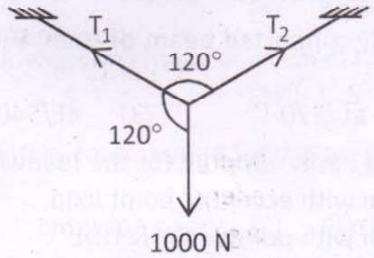
39. Other parameters being unchanged, if the span of a cantilever carrying end point load is doubled, the maximum slope is increased by

(1) 2 times (2) 4 times (3) 8 times (4) 16 times

40. The condition for stability of a dam against over turning is

(1) $\frac{P \cdot h/3}{W(b-\bar{x})} \geq$ f.s. (2) $\frac{W(b-\bar{x})}{P \times h/3} \geq$ f.s. (3) $\frac{P \cdot h/3}{Wb} \geq$ f.s. (4) $\frac{W \cdot b}{P \cdot h/3} \geq$ f.s.

41. For the force system shown below, the tension T_1 in the rope is



(1) 500 N (2) 866 N (3) 1000 N (4) 1732 N

42. The horizontal component of a force P acting towards north is

(1) O (2) P (3) 2P (4) ∞

43. The moment of inertia of a semi-circle of diameter D about its base diameter is

(1) $\frac{\pi}{32} D^4$ (2) $\frac{D^4\pi}{64}$ (3) $\frac{\pi D^4}{128}$ (4) $\frac{\pi D^4}{256}$

44. The number of unknown reactions to be found at a fixed support of a beam, during analysis is/are

(1) 1 (2) 2 (3) 3 (4) 4

45. Effective length of a column of length 'L' with one end fixed and other end hinged is given by

(1) Le = L (2) Le = L/2 (3) Le = $L/\sqrt{2}$ (4) Le = 2L

46. If cohesion > adhesion, then

(1) Capillary rise occurs (2) Depression occurs
(3) remain plane (4) either rise or fall

47. For a vacuum pressure of 4.5 m of water, the equivalent absolute pressure is

(1) 5.83 m of water (2) 14.83 m of water
(3) 12.33 m of water (4) 8.83 m of water

48. A vertical triangular area with vortex downward and altitude 'h' has its base on the free surface of the liquid. The centre of pressure below the free surface will be at a depth of

(1) h/4 (2) h/3 (3) h/2 (4) 2h/3

49. The velocity at the Reynold's number equal to 2000 is called

(1) Critical velocity (2) Lower critical velocity
(3) Higher critical velocity (4) Uniform velocity

50. To avoid separation, the most suitable ratio of throat diameter and pipe diameter in a venturimeter is

(1) $\frac{1}{4}$ to $\frac{1}{2}$ (2) $\frac{1}{3}$ to $\frac{1}{2}$ (3) $\frac{1}{3}$ to 1 (4) 1 to 4

51. Due to each end contraction, the crest length is reduced by

(1) 0.1 L (2) 0.1 H (3) $0.1\ v^2/2g$ (4) 0.01 L

52. Condition for broad crested weir is

(1) $2b > H$ (2) $2b < H$ (3) $H < b$ (4) $b = 2H$

53. To prevent cavitation to occur, the maximum height of the summit of the syphon shall be

(1) 7.5 m (2) 10.3 m (3) 15 m (4) 20 m

54. A turbine is a device which converts

(1) Hydraulic energy into Mechanical energy
(2) Mechanical energy into Hydraulic energy
(3) Kinetic energy into Mechanical energy
(4) Electrical energy into Mechanical energy

55. Francis turbine is a

(1) Axial flow impulse turbine (2) Radial flow reaction turbine
(3) Axial flow reaction turbine (4) Radial flow impulse turbine

56. Capillarity is due to

(1) Cohesion only (2) Adhesion only
(3) Both cohesion and adhesion (4) Viscosity only

57. The position of centre of pressure on a plane surface immersed vertically in a static mass of fluid is

(1) at the centre of submerged area (2) always above the centre of gravity
(3) always below the centre of gravity (4) has no relation with centre of gravity

58. Hydraulic gradient line (HGL) represents sum of

(1) Pressure head and kinetic head
(2) Kinetic head and datum head
(3) Pressure head, kinetic head & datum head
(4) Pressure head and datum head

59. The inlet length of venturimeter

(1) is equal to the outlet length
(2) is more than the outlet length
(3) is less than the outlet length
(4) has no relation with the outlet length

60. The average value of co-efficient of velocity is

(1) 0.62 (2) 0.76 (3) 0.84 (4) 0.97

61. The discharge over a right angled V-notch is

(1) $\frac{8}{15} cd\sqrt{2g}\, H$ (2) $\frac{8}{15} cd\sqrt{2g}\, H^{3/2}$ (3) $\frac{8}{15} cd\sqrt{2g}\, H^2$ (4) $\frac{8}{15} cd\sqrt{2g}\, H^{5/2}$

62. Low discharges are effectively measured by
(1) Rectangular notch (2) Stepped notch
(3) Trapezoidal notch (4) Triangular notch

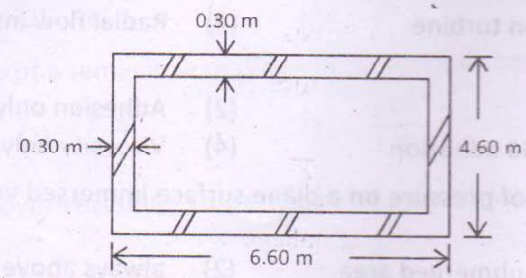
63. The hydraulic mean depth of a pipe of 1 m diameter flowing full is
(1) 0.12 m (2) 0.5 m (3) 0.25 m (4) 2.0 m

64. The discharge through a channel of rectangular section will be maximum if
(1) Its depth is twice the breadth. (2) Its breadth is twice the depth.
(3) Its depth is thrice the breadth. (4) Its breadth is thrice the depth.

65. A drop of water maintains its spherical shape on account of its
(1) Cohesion (2) Adhesion (3) Viscosity (4) Capillarity

66. The quantities and unit rate of certain items of work of building are
(i) Brick work of 20 m^3 and ₹ 2520/- per m^3
(ii) Plastering of 150 m^2 and ₹ 1250/- per m^2
Calculate the total cost of the items given.
(1) ₹ 50,400 = 00 (2) ₹ 1,87,500 = 00 (3) ₹ 1,37,100 = 00 (4) ₹ 2,37,900 = 00

67. Calculate the quantity of internal plastering for a enclosure as shown below. The height is 3.0 m.

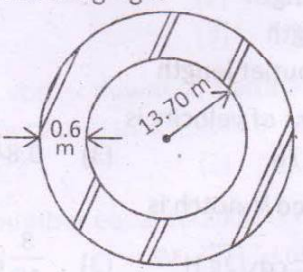


(1) 10 m^2 (2) 20 m^2 (3) 60 m^3 (4) 60 m^2

68. Estimate the cost of brick work for a wall of 4 m long, 3 m high and 30 cm thick. The rate of brick work is ₹ 1,500 = 00 per Cu.m.
(1) ₹ 5,40,000 (2) ₹ 54,000 (3) ₹ 18,000 (4) ₹ 5,400

69. Calculate the quantity of earth work by mid-ordinate method, for 200 m length of a portion of road in an uniform ground. The heights of banks at the two ends being 1.00 m and 2.00 m. The formation width is 10 m and side slope 2:1.
(1) 3800 Cu.m (2) 3900 Cu.m (3) 3950 Cu.m (4) 4000 Cu.m

70. The centre line length of the following fig is



(1) 26.20 πm (2) 28 πm (3) 28.60 πm (4) 196 πm

71. As per IS 3861:2002, in the detailed estimate the volumes are worked out to the nearest of
(1) 0.01 Cu.m (2) 0.05 Cu.m (3) 0.005 Cu.m (4) 0.001 Cu.m

72. Estimate the rate of metal at site per Cu.m. whose rate at source is ₹ 800/Cu.m (including loading & unloading) and lead of 35 km @ a rate of ₹ 20/km
(1) ₹ 800 = 00 (2) ₹ 700 = 00 (3) ₹ 1500 = 00 (4) ₹ 2000 = 00

73. If 'b' is the width of formation, 'd' is the height of the embankment, of length 'L' and side slope n : 1 for a road, the quantity of earth work is
(1) $(b/d + nd) L$ (2) $(bd + nd^2) L$ (3) $(bd - n\sqrt{d}) L^2$ (4) $L/2 (bd + nd^2)$

74. Abstract estimate is
(1) Estimation of quantities of various items of work
(2) Estimation of unit rates of various items of work
(3) Estimation of cost of various items of work
(4) Estimation of leads of various items of work

75. Detailed specifications includes
(1) Rates of various items of work
(2) Measurements taken after execution of work
(3) Quantities of items dumped at site
(4) Quantities and qualities of materials

76. The relation between modulus of rupture (f_{cr}) and characteristic compressive strength (f_{ck}) is given by
(1) $f_{cr} = 0.7 f_{ck}$ (2) $f_{cr} = 0.7\sqrt{f_{ck}}$ (3) $f_{cr} = 0.75 f_{ck}$ (4) $f_{cr} = 0.7/\sqrt{f_{ck}}$

77. The approximate value of the total shrinkage strain in concrete for design is taken as
(1) 0.0001 (2) 0.0003 (3) 0.002 (4) 0.0035

78. A beam of 400 mm effective depth with a neutral axis constant of 0.39, the value of lever arm is
(1) 250 mm (2) 300 mm (3) 348 mm (4) 358 mm

79. For vertical stirrups, the maximum spacing of shear reinforcement measured along the axis of the member shall not exceed
(1) 0.75 d (2) 0.40 d (3) 0.15 d (4) 0.12 d

80. Calculate the pitch of lateral ties for a column of 300 mm square with 20 mm dia longitudinal bar and 8 mm ϕ lateral tie.
(1) 384 mm (2) 320 mm (3) 300 mm (4) 280 mm

81. Calculate the strength of fillet weld per 1 mm of 6 mm size with allowable shear stress in the weld 100 Mpa.
(1) 700 N (2) 600 N (3) 424 N (4) 420 N

82. The section modulus and the plastic modulus of a section are Z and P respectively. Then its shape factor is given by
(1) Z/P (2) P/Z (3) (P – Z)/P (4) (P – Z)/Z

83. The lacing of a compression member is designed to resist a total transverse shear 'V' equal to
(1) 1.25% of the axial force in the member
(2) 1.5% of the axial force in the member
(3) 2.0% of the axial force in the member
(4) 2.5% of the axial force in the member

84. In case of limit state, the maximum strain in concrete at the outermost compression fibre in bending is
(1) 0.35 (2) 0.035 (3) 0.0035 (4) 0.002

85. In the designation of a concrete mix, the letter 'M' and the number stands for
(1) Mix and characteristic compressive strength of 100 mm cube at 28 days
(2) Mix and characteristic compressive strength of 75 mm cube at 28 days
(3) Mix and characteristic compressive strength of 150 mm cube at 28 days
(4) Mix and characteristic compressive strength of 125 mm cube at 28 days

86. The size of the rectangular section is fixed and the moment of resistance of a singly reinforced section is less than design moment. The beam shall be designed as
(1) Under-reinforced (2) Over-reinforced
(3) Doubly reinforced (4) Compressive failure

87. In M20 & M25, the number is characteristic compressive strength in N/mm^2 at _____ days.
(1) 7 (2) 14 (3) 21 (4) 28

88. The grade of concrete generally not used in the reinforced concrete is
(1) M40 (2) M25 (3) M20 (4) M10

89. If the given bending moment is greater than moment of resistance of balanced section, then the section is
(1) Balanced section (2) Under-reinforced section
(3) Over-reinforced section (4) Critical section

90. Modulus of elasticity of steel shall be taken as
(1) 200 kN/mm^2 (2) 2×10^3 N/mm^2 (3) 2×10^4 N/mm^2 (4) 2×10^2 N/mm^2

91. The area between the 180 hytes 0.45 and 0.55 m is 100 Sq.km and between 0.55 and 0.60 m is of 150 Sq.km. The average depth of annual precipitation over the above basin of 250 Sq.km will be
(1) 0.50 m (2) 0.55 m (3) 0.56 m (4) 0.60 m

92. Duty should clearly state
(1) Time of measurement of water (2) Place of measurement of water
(3) Method of measurement of water (4) Maximum rainfall

93. If the catchment area is 100 Sq. km and the value of constant is 12.47, then the maximum flood discharge as per Dicken's formula is
(1) $Q = 12.47 \times 100^{2/3}$ (2) $Q = 100 \times 12.47^{3/4}$
(3) $Q = 100 \times 12.47^{2/3}$ (4) $Q = 12.47 \times 100^{3/4}$

94. The escape of earth from underneath the foundation of a weir along with the percolated water results in a phenomenon called
(1) Piping (2) Creep (3) Uplift (4) Scour

95. The net free board is
(1) Difference of level between MWL and FRL.
(2) Difference between top of dam and MWL.
(3) Difference between top of dam and FRL.
(4) Difference between top of dam and bed level.

96. A canal which is aligned at right angles to the contour is called
(1) Contour canal (2) Watershed canal
(3) Ridge canal (4) Side slope canal

97. The sill of the notches in a canal is kept at
(1) Bed level of downstream channel (2) FSL of upstream channel
(3) FSL of down-stream channel (4) Bed level of upstream channel

98. The process of making unfertile barren land as fertile land is called
(1) Soil conservation (2) Land reclamation
(3) Gully erosion (4) Afforestation

99. Correct statement from the following is
(1) Crop period is slightly more than base period.
(2) Base period is slightly more than crop period.
(3) Crop period is equal to the base period.
(4) Crop period and base period are expressed in hours.

100. Pick out the factor which does not affect runoff
(1) Shape of catchment (2) Existence of vegetation
(3) Type of soil (4) Existence of building

101. The major resisting force in a gravity dam is
(1) Water pressure (2) Wave pressure
(3) Self weight of dam (4) Uplift pressure

102. Dead storage in a reservoir is provided
(1) To meet emergency needs
(2) To mitigate floods
(3) To accommodate the sill-trapped in the reservoir
(4) To increase the useful life period

103. A surplus weir of an earthen dam with stepped apron is classified as
(1) Type – A (2) Type – B (3) Type – C (4) Type – D

104. Generally irrigation can be practiced on one side of a
(1) Contour canal (2) Side slope canal (3) Ridge canal (4) Branch canal

105. A canal which will not intercept any natural drainage is called as
(1) Contour canal (2) Side slope canal (3) Ridge canal (4) Branch canal

106. The method used to remove the salinity of the soil is
(1) Flood irrigation (2) Sprinkler irrigation
(3) Leaching (4) Surface irrigation

107. The average Δ of rice crop is nearer to
(1) 400 mm (2) 800 mm (3) 1200 mm (4) 1600 mm

108. Water loss through the leaves of plants is termed as
(1) Precipitation (2) Infiltration
(3) Transpiration (4) Surface evaporation

109. A divide wall is constructed for the purpose of
(1) Controlling seepage (2) Scouring the silt
(3) Creating a still pond (4) Providing a fish passage

110. A rock toe filter in an earthen dam is provided on
(1) Upstream end of the bund
(2) Under the base of the bund
(3) Downstream end of the bund
(4) At the centre of the bund along the length

111. The formula $P_n = P\left(1 + \frac{r}{100}\right)^n$ is used for forecasting population by
(1) Arithmetical increase method (2) Geometrical increase method
(3) Incremental increase method (4) Graphical method

112. The geological formation which yields sufficient quantity of water is called
(1) Aquifuge (2) Aquiclude (3) Aquifer (4) Aquitard

113. Hardness is expressed in mg/l as
(1) $Ca(HCO_3)_2$ (2) $CaCO_3$ (3) $Ca(OH)_2$ (4) $CaSO_4$

114. Super chlorination is done
(1) In day to day practice (2) During an epidemic
(3) During winter (4) During summer

115. The normal temperature of sewage when compared to that of water is generally
(1) Lower (2) Higher (3) Same (4) Has no relation

116. The detention period in primary sedimentation tank in a sewage treatment plant is
(1) 1 to 3 hrs (2) 4 to 8 hrs (3) 8 to 12 hrs (4) 12 to 18 hrs

117. The upper most layer of atmosphere is called
(1) Stratosphere (2) Mesosphere (3) Ionosphere (4) Exosphere

118. The base of cone of depression is called
(1) Circle of influence (2) Radius of influence
(3) Draw down (4) Specific yield

119. Presence of chlorides and sulphates of calcium and magnesium in water causes
(1) Acidity (2) Temporary hardness
(3) Permanent hardness (4) Softness

120. Odour and taste is controlled by
(1) Disinfection (2) Aeration
(3) Coagulation (4) Soda-lime process

121. Distribution layout in which the mains, sub-mains and branches are interconnected with each other is
(1) Tree-System (2) Grid Iron System
(3) Radial System (4) Dead end System

122. The valves which are used to remove the sediment in a pipe line is called
(1) Drain valve (2) Scour valve (3) Air valve (4) Sluice valve

123. The deplorable aspect of conservancy system is
(1) Recurring cost is high.
(2) Vehicles are required to carry night soil.
(3) Vast areas for disposal are necessary.
(4) Human element is involved in collection and transportation of human waste.

124. The settleable faecal and other organic solids are removed in
(1) Activated sludge process (2) Trickling filter
(3) Primary sedimentation tank (4) Secondary sedimentation tank

125. A water borne disease is
(1) Malaria (2) Plague (3) Dysentry (4) Encephalitis

126. The permissible turbidity in mg// for potable water is
(1) 30 – 40 (2) 20 – 30 (3) 10 – 15 (4) 5 – 10

127. Over flow pipes are provided in service reservoirs at
(1) Floor level (2) Top of the reservoir
(3) Full reservoir level (4) Mid level

128. For ease in the design of sewers, the following are made use of
(1) Thumb rules (2) Nomograms
(3) Emperical formulae (4) Hydraulic formulae

129. The hydraulic mean depth of a circular sewer running half full is equal to
(1) d/2 (2) d/4 (3) d/6 (4) d/8

130. The animals which feed directly on living plant or plant remains are called
(1) Carnivores (2) Annivores (3) Herbivores (4) Macrophytes

131. A common problem in hill roads is
(1) Skid (2) Earthquake (3) Slip (4) Land slide

132. Calculate the rise of crown with respect to edges for a cement concrete road of 10.00 m width and situated in areas of heavy rainfall.
(1) 0.01 m (2) 0.05 m (3) 0.07 m (4) 0.10 m

133. When an ascending gradient 1 in 100 meets with a descending gradient of 1 in 20, calculate the deviation angle (N)
(1) 1/600 (2) 11/600 (3) 15/600 (4) 30/600

134. A pavement has a horizontal curve of 1000 m for a design speed of 75 kmph. The super-elevation is
(1) 1 in 70 (2) 1 in 60 (3) 1 in 40 (4) 1 in 50

135. A soil has a volume of 100 cm^3 and mass of 200 gr on over drying for 24 hrs. The mass is reduced to 100 gr. Calculate the dry density.
(1) 9.81 kN/m^3 (2) 14.72 kN/m^3 (3) 19.62 kN/m^3 (4) 24.53 kN/m^3

136. A soil deposit having water content 15%, specific gravity 2.5 and voids ratio 0.5, calculate degree of saturation.
(1) 50% (2) 70% (3) 75% (4) 90%

137. Exceptional gradient in plains as per IRC
(1) 1 in 90 (2) 1 in 15 (3) 1 in 40 (4) 1 in 30

138. As per IS soil classification, inorganic soils with low compressibility are represented by
(1) MH (2) SL (3) ML (4) OL

139. As per IS soil classification, clays, organic soils are represented by
(1) MH (2) SL (3) ML (4) OH

140. As per IS soil classification Gravelly soils, more than half of the grains larger than IS Sieve 480 are represented by
(1) GM (2) GL (3) GS (4) SM

141. A soil sample has a porosity of 50%, calculate voids ratio
(1) 3.0 (2) 1.0 (3) 0.5 (4) 0.33

142. A soil has a volume of 100 cm^3 and mass of 200 gr. on over drying for 24 hrs, the mass is reduced to 150 gr. Calculate the water content
(1) 30% (2) 33% (3) 50% (4) 55%

143. A soil has a volume of 100 cm^3 and mass of 200 gr. on over drying for 24 hrs, the mass is reduced to 150 gr. Calculate the bulk density.
(1) 9.81 kN/m^3 (2) 14.72 kN/m^3 (3) 19.62 kN/m^3 (4) 24.53 kN/m^3

144. Layout of centre line of the highway on the ground is called as
(1) Setting out (2) Stake out (3) Alignment (4) Base line

145. Alternate routes for a highway project are suggested by the study of
(1) Political map (2) Traffic map (3) Topographic map (4) Road map

146. IRC Committee was appointed by the Government with M.R. Jayaker as chairman in
(1) 1920 (2) 1925 (3) 1926 (4) 1927

147. In urban areas, when the volume of cycle traffic in high, minimum width provided for the cycle track is
(1) 3.5 m (2) 3.0 m (3) 2.0 m (4) 1.5 m

148. To divide the traffic moving in opposite direction _____ is provided.
(1) Kerb (2) Footpath (3) Median (4) Drive way

149. Pycnometer is used
(1) to measure only specific gravity
(2) to measure only water content
(3) to measure specific gravity and water content
(4) to measure specific area

150. Water formed transported soil is
(1) Loess (2) Glacier (3) Alluvial (4) Marine