CEJ/DSIF/I/25/7

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Test Booklet No. : 04573

Series A

TEST BOOKLET

CIVIL ENGINEERING

(Paper—I)

Time Allowed : 2 Hours **Full Marks : 100**

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.
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SEAL

[No. of Questions : 100]

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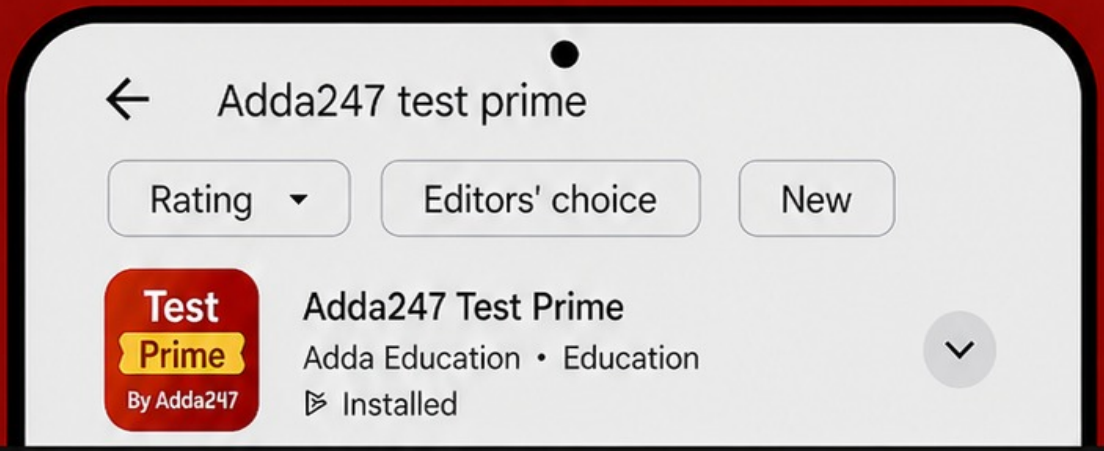

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1. The maximum percentage of water absorption by first-class bricks in 24 hours should be limited to

   (A) 10%

   (B) 15%

   (C) 20%

   (D) 25%

2. Stones most suitable as ballast are

   (A) marble

   (B) sandstone

   (C) slate

   (D) gneiss

3. If water required for 1 bag of cement is 30 litres for a particular grade of concrete, then the water-cement ratio is

   (A) 0·6

   (B) 0·5

   (C) 0·4

   (D) 0·45

4. In normal consistency test of cement, the diameter of the plunger used is

   (A) 1 mm

   (B) 5 mm

   (C) 10 mm

   (D) 50 mm

5. If 30% of water is the normal consistency of a particular cement, then the percentage of water to be added for the determination of initial setting time is

   (A) 30%

   (B) 32%

   (C) 28%

   (D) 25·5%

6. Which of the following is an example of argillaceous rock?

   (A) Kaoline

   (B) Slate

   (C) Laterite

   (D) All of the above

7. Concrete in seawater in the case of reinforced cement concrete should be at least

   (A) M20

   (B) M25

   (C) M30

   (D) M35

8. On which type of sand, the bulking effect is maximum?

   (A) Coarse sand

   (B) Medium sand

   (C) Fine sand

   (D) None of the above

9. The liquid part of the paint is called

(A) pigment

(B) vehicle

(C) solvent

(D) base

10. Annual rings of a tree represent its

(A) life

(B) durability

(C) strength

(D) density

11. The main object of providing camber is

(A) to make the road surface impervious

(B) to make the road surface durable

(C) to drain off rainwater from road surface as quickly as possible

(D) All of the above

12. The value of ruling gradient in plain as recommended by Indian Road Congress is

(A) 1 in 10

(B) 1 in 20

(C) 1 in 30

(D) 1 in 40

13. The recommended width of carriage-way for two lanes without raised kerbs, as per the Indian Road Congress, is

(A) 5·5 m

(B) 7·0 m

(C) 7·5 m

(D) 6·5 m

14. The rate of superelevation, if full lateral friction is assumed to develop for a horizontal curve of radius 240 m, design speed 80 kmph and coefficient of friction of lateral friction 0·15, will be

(A) 0·02 (B) 0·06

(C) 0·08 (D) 0·10

15. For a vehicle moving with a speed of 80 km/hr, the brake reaction time, in ordinary case, is

(A) 1·0 sec (B) 1·5 sec

(C) 2·0 sec (D) 2·5 sec

16. If the difference of an edge of the pavement and its crown is 30 cm, the camber in the 18 m wide pavement is

(A) 1 in 10

(B) 1 in 20

(C) 1 in 30

(D) 1 in 40

17. Impact test assesses the property of material such as its

(A) hardness

(B) strength

(C) toughness

(D) brittleness

18. The method of design of flexible pavement as recommended by IRC is

(A) group index method

(B) CBR method

(C) Westergaard method

(D) None of the above

19. When 1 cm on a map represents 10 m on the ground, the representative fraction of the scale is

(A) 1 : 10

(B) 1 : 100

(C) 1 : 1000

(D) 1 : 10000

20. The test carried out to know the resistance to flow of a given bituminous material is

(A) softening point

(B) penetration

(C) ductility

(D) viscosity

21. When a chain of designated length L and actual length L' is used for measuring a line, the true length of the line will be

(A) $(L/L') \times$ measured length

(B) $(L'/L) \times$ measured length

(C) $(L' - L) \times$ measured length

(D) $(L' + L) \times$ measured length

22. The angle of inclination in between the longitudinal axis of a magnetic needle and the horizontal plane at any place is

(A) dip

(B) magnetic declination

(C) magnetic bearing

(D) true bearing

23. The whole circle bearing of a line is 325°15′. What is its quadrantal bearing?

(A) N 25°15′ W

(B) N 55°15′ W

(C) N 34°45′ W

(D) N 35°45′ W

24. The 0° of a prismatic compass is marked at

(A) north side

(B) east side

(C) west side

(D) south side

25. The whole circle bearing of lines *OP* and *OQ* are 18°15′ and 335°45′ respectively. What is the value of the included angle *OQP*?

(A) 317°30′ (B) 177°00′

(C) 42°30′ (D) 43°30′

26. For a tacheometer, the additive and multiplying constants are respectively

(A) 0 and 0

(B) 0 and 100

(C) 100 and 0

(D) 100 and 100

27. If the length of an arc or chord is 20 m, then 1° curve will have a radius of

(A) 1718·9 m

(B) 2865 m

(C) 573 m

(D) 1146 m

28. A cube of dried clay having sides 4 cm long weighs 110 g. The same cube of soil, when saturated at unchanged volume, weighs 135 g. Find the volume of voids.

(A) 64 cm^3

(B) 25 cm^3

(C) 39 cm^3

(D) 16 cm^3

29. A contour line shows

(A) a horizontal distance between points

(B) the points of equal elevations

(C) the vertical distance between two points having different elevations

(D) None of the above

30. The method of plane table surveying recommended when points could not be chained is

(A) resection

(B) radiation

(C) intersection

(D) traversing

31. If L is the length of a line having bearing θ, then the latitude of the line is given by

(A) $L\sin\theta$

(B) $L\cos\theta$

(C) $L\tan\theta$

(D) None of the above

32. A 'face left' position of a theodolite occurs when

(A) the vertical circular plate is to the right of the observer

(B) the vertical circular plate is to the left of the observer

(C) the horizontal circular plate is levelled

(D) None of the above

33. The areas of two successive contours of a reservoir are 100 sq. m and 200 sq. m having contour interval 5 m. The volume of water between the contours is

(A) 1000 cu. m

(B) 2000 cu. m

(C) 750 cu. m

(D) 3000 cu. m

34. The maximum size of the particles of clay is about

(A) 0·0002 mm

(B) 0·002 mm

(C) 0·02 mm

(D) 0·2 mm

35. A compacted soil mass has void ratio 0·6, degree of saturation 78% and specific gravity 2·6. What is the water content of the soil?

(A) 23%

(B) 20%

(C) 18%

(D) 25%

36. The relationship between porosity (n) and void ratio (e) can be expressed by

(A) $1+n=\frac{1}{1+e}$

(B) $1-n=\frac{1}{1+e}$

(C) $n=\frac{1}{e}$

(D) $n=\frac{1}{1+e}$

37. The densification of soil by mechanical means is called

(A) consolidation

(B) compression

(C) compaction

(D) All of the above

38. The minimum moisture content at which the soil just begins to crumble when rolled into 3 mm thread is known as

(A) elastic limit

(B) consistency limit

(C) plastic limit

(D) liquid limit

39. The critical hydraulic gradient of seepage of water in a soil medium is

(A) $\frac{1-G}{1+e}$

(B) $\frac{G-1}{1+e}$

(C) $\frac{1+e}{1-G}$

(D) $\frac{1+e}{G-1}$

40. The angle of internal friction for purely cohesive soil is equal to

(A) 20°

(B) 25°

(C) 0°

(D) 15°

41. The bearing capacity factors N_c, N_q and N_r are the functions of

(A) cohesion of the soil

(B) angle of internal friction

(C) Both (A) and (B)

(D) None of the above

42. The settlement of a footing (S_f) in sandy soil is given by

(A) $\frac{S_p}{B_p} \times B_f$

(B) $\frac{S_p}{B_f} \times B_p$

(C) $S_p \times \left(\frac{B_p + 30}{B_f + 30}\right)^2$

(D) $S_p \times \left(\frac{B_f + 30}{B_p + 30}\right)^2$

where

S_p = settlement of the plate in cm

B_p = width of the plate in cm

B_f = width of the foundation in cm

43. Soil transported by wind is called

(A) aeolian soil

(B) marine soil

(C) alluvial soil

(D) lacustrine soil

44. When the plastic limit of a soil is greater than the liquid limit, then the plasticity index is

(A) negative

(B) zero

(C) one

(D) more than one

45. Quicksand is

(A) the one that losses moisture rapidly

(B) a type of pure silica sand

(C) a condition where a cohesionless soil losses its strength because of upward flow of water

(D) a sand consisting of spherical sand particles only

46. Plasticity index defined as the range of water content between

(A) liquid limit and plastic limit

(B) plastic limit and semi-solid limit

(C) semi-solid limit and liquid limit

(D) liquid limit and solid limit

47. The permissible pH value for public water supply is between

(A) 4·5 to 5·5

(B) 5·5 to 6·5

(C) 6·5 to 8·5

(D) 8·5 to 10·5

48. The acceptable limit for total dissolved solid content in water for domestic purpose is

(A) nil

(B) 400 p.p.m.

(C) 500 p.p.m.

(D) 1000 p.p.m.

49. The pathogens can be killed by

(A) nitrification

(B) chlorination

(C) oxidation

(D) None of the above

50. Design period for a water supply project is taken as

(A) 5 to 10 years

(B) 15 to 20 years

(C) 20 to 30 years

(D) more than 50 years

51. Carbon monoxide in air affects

(A) heart

(B) skin

(C) eye

(D) hair

52. The test period for BOD of water is

(A) 10 days at 30 °C

(B) 4 days at 20 °C

(C) 5 days at 20 °C

(D) 7 days at 30 °C

53. The presence of calcium chloride and magnesium chloride in water causes

(A) odour

(B) turbidity

(C) hardness

(D) coagulation

54. Wastewater from kitchens and bathrooms of residential building is

(A) sewage

(B) domestic effluent

(C) sullage

(D) sludge

55. The major greenhouse gas present in atmosphere is

(A) nitrogen

(B) oxygen

(C) methane

(D) carbon dioxide

56. The bacteria which requires oxygen for their survival is known as

(A) anaerobic bacteria

(B) pathogenic bacteria

(C) aerobic bacteria

(D) non-pathogenic bacteria

57. Freeman formula for estimating the fire demand (Q) in litres per minute is given by

(A) $Q = 1136\left(\frac{P}{5}+10\right)$

(B) $Q = 2500\left(\frac{P}{5}+10\right)$

(C) $Q = 3182\sqrt{P}$

(D) $Q = 5663\sqrt{P}$

58. Colloidal impurities if associated with organic matter having bacteria become the chief source of

(A) hardness

(B) epidemic

(C) alkalinity

(D) bad taste

59. The pH value indicates the concentration of

(A) magnesium ion

(B) hydrogen ion

(C) calcium ion

(D) sodium ion

60. The effluent from septic tank is discharged into

(A) soak pit

(B) settling tank

(C) oxidation pond

(D) sewer

61. The unit of measurement for half brick wall is

(A) cu. m

(B) sq. m

(C) running meter

(D) All of the above

62. The number of ordinary bricks required for 100 cu. m of masonry wall is

(A) 500

(B) 5000

(C) 50000

(D) 500000

63. While mixing cement mortar by volume, the volume of a cement bag is specified as

(A) 50 litres

(B) 35 litres

(C) 0·50 cu. m

(D) 0·35 cu. m

64. One cubic meter of cement concrete (1 : 2 : 4) is to be mixed by volume. The number of cement bags required approximately will be

(A) 1

(B) 3

(C) 6

(D) 11

65. The volume of earthworks in embankment of length 12 m, top width 5·5 m and depth 2·5 m having side slopes 1½ : 1 is

(A) 77·5 cu. m

(B) 277·5 cu. m

(C) 27·75 cu. m

(D) 2·775 cu. m

66. PERT is

(A) activity oriented

(B) event oriented

(C) time oriented

(D) resource oriented

67. The total length of centre line of all walls for a room of external dimensions 4·60 m × 3·10 m and the thickness of wall 30 cm is

(A) 14·20 m

(B) 12·04 m

(C) 14·26 m

(D) 10·00 m

68. The event which marks the beginning of an activity is known as

(A) head event

(B) tail event

(C) dual role event

(D) None of the above

69. The pre-tender stage of construction requires

(A) selection of site

(B) acquisition of land

(C) finalization of design

(D) All of the above

70. A dummy activity in a network

(A) is represented by a dotted line

(B) is an artificial activity

(C) does not consume time and resources

(D) All of the above

71. What is the first step in project planning?

(A) Establish the objectives and scope

(B) Determine the budget

(C) Select the team organizational model

(D) Inspect the deliverables

72. A pile which does not carry any load itself but improves the bearing capacity of soil is called

(A) sheet pile

(B) friction pile

(C) bearing pile

(D) compaction pile

73. A footing which supports two columns is known as

(A) strap footing

(B) strip footing

(C) combined footing

(D) raft footing

74. A temporary structure constructed to provide a safe working platform is known as

(A) raking

(B) shoring

(C) scaffolding

(D) jacking

75. The difference between the maximum time available and the actual time needed to perform an activity is known as

(A) free float

(B) independent float

(C) total float

(D) interfering float

76. Which of the following is a sound absorbent material?

(A) Hair felt

(B) Wood particle board

(C) Glass wool

(D) All of the above

77. The minimum grade of concrete for building with more than 15 m height in seismic zone V is

(A) M25

(B) M30

(C) M20

(D) All of the above

78. The IS code which deals with ductile detailing in RCC is

(A) IS : 456

(B) IS : 19320

(C) IS : 13920

(D) IS : 875

79. Disinfection of water is done to remove

(A) odour

(B) bacteria

(C) turbidity

(D) colour

80. Grit chamber is similar to

(A) screening tank

(B) sedimentation tank

(C) coagulation tank

(D) All of the above

81. For wastewater treatment process, trickling filter is used in

(A) primary treatment

(B) secondary treatment

(C) advanced treatment

(D) final treatment

82. Removal of oil and grease from sewage is known as

(A) screening

(B) skimming

(C) filtration

(D) None of the above

83. Seismic map of India given in IS1893 (Part-1) : 2016 divides the country into which of the following numbers of zones?

(A) 4

(B) 5

(C) 6

(D) 7

84. Earthquake-resistant building should have

(A) strong columns–strong beams

(B) weak columns–strong beams

(C) strong columns–weak beams

(D) weak columns–weak beams

85. Unsymmetrical buildings show more damage during earthquakes because of

(A) bending

(B) shear

(C) torsion and warping

(D) None of the above

86. Shear walls are subjected to

(A) out-of-plane bending

(B) in-plane bending

(C) Both (A) and (B)

(D) No bending

87. Minimum thickness of shear walls as per IS : 13920 is

(A) 180 mm

(B) 400 mm

(C) 200 mm

(D) 150 mm

88. RCC beams and columns can be strengthened by

(A) grouting

(B) guniting

(C) splint and bonding

(D) jacketing

89. Floating columns cause lot of damage during earthquake because they

(A) cause a large deformation in the building

(B) cause discontinuity in path of transfer of inertia force

(C) make the building stiffer

(D) None of the above

90. Pycnometer method for water content determination is more suitable for

(A) clay

(B) loess

(C) sand

(D) silt

91. Gantt chart is drawn for

(A) time versus activity

(B) activity versus resources

(C) resources versus progress

(D) progress versus time

92. The Indian Road Congress came into existence in

(A) 1927

(B) 1930

(C) 1934

(D) 1947

93. If the bearing of line *AB* is N 87°32′00″ E and that of the line *BC* is S 65°35′20″ E, then the deflection angle at *B* is

(A) 26°52′40″ L

(B) 26°52′40″ R

(C) 36°52′20″ R

(D) 36°52′20″ L

94. A revised estimate is prepared when there is variations with sanctioned estimate by

(A) 2·5%

(B) 4%

(C) 5%

(D) 10%

95. For ordinary levelling survey for a building, the benchmark considered is

(A) GTS benchmark

(B) arbitrary benchmark

(C) temporary benchmark

(D) permanent benchmark

96. The surface of water of a still lake is an example of a/an

(A) horizontal surface

(B) level surface

(C) undulating surface

(D) vertical plane

97. Which type of orientation is best for plane table surveying?

(A) By backsighting

(B) By magnetic needle

(C) Both (A) and (B)

(D) None of the above

98. The maximum limit for total arsenic content for potable water is

(A) nil

(B) 0·01 mg/lit

(C) 0·05 mg/lit

(D) 0·1 mg/lit

99. In chain surveying, which operation is done first?

(A) Chaining

(B) Ranging

(C) Both (A) and (B) are done simultaneously

(D) None of the above

100. Isogonic line on a map represents lines connecting points of

(A) equal elevations

(B) same temperatures

(C) equal magnetic declination

(D) equal local attractions

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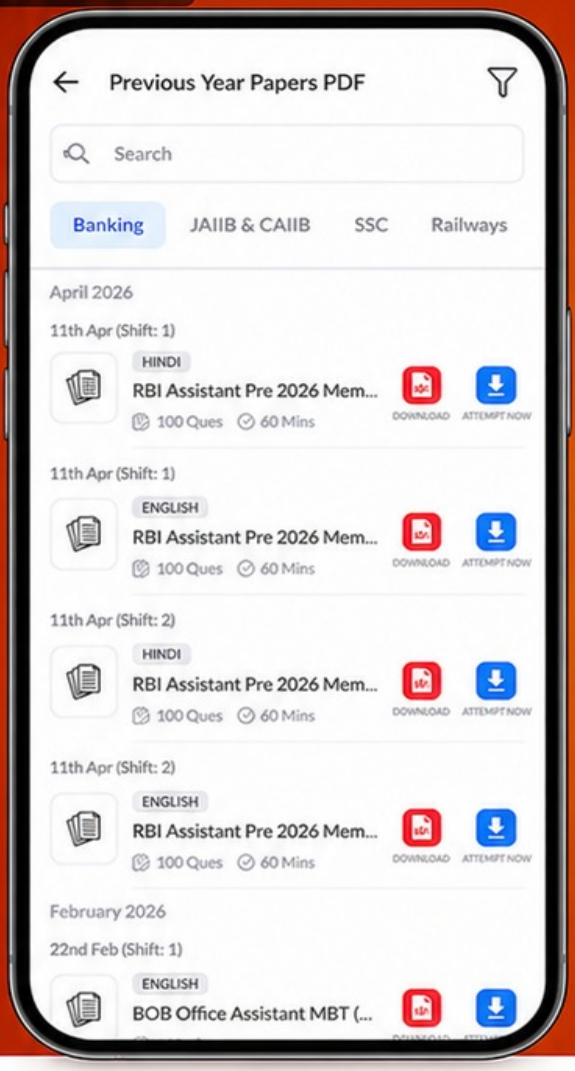

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