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SAE
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INSTRUCTIONS

Candidates should read the following instructions carefully before answering the questions :

1. This booklet consists of 16 pages including this front page. Verify the page Nos. and Group on each page and bring at once to the Invigilator's notice, discrepancy, if any.
2. **Answer will have to be given in the Answer-Sheet supplied for the purpose.**
3. You should write your Roll No. & Full Signature on this page (where directed) and Full name, Roll No., Centre of Examination, Booklet Group & Full Signature with date (where indicated) on the Answer-Sheet in BLACK Ball Point Pen.
4. All questions are of multiple-choice answer type. You will find your probable answers (A), (B), (C) & (D) against each question. Find out which of the four answers appears to you to be correct. NOW DARKEN COMPLETELY WITH BLACK BALL POINT PEN WITHIN THE CIRCLE BELOW THE LETTER OF THE SELECTED ANSWER IN THE ANSWER-SHEET AS SHOWN HEREUNDER :

Example— Question : Kolkata is the capital city of—

(A) Bihar (B) Assam (C) Orissa (D) West Bengal

Answer : (A) ○ (B) ○ (C) ○ (D) ●

5. i) **If more than one circle is darkened for a particular answer it will be treated as an incorrect/wrong answer.**
   ii) **Any sign other than complete darken inside the circle will be treated as incorrect/wrong answer.**
6. **There are 100 questions carrying 2 (TWO) marks each.**
7. **THERE WILL BE NEGATIVE MARKING. 1 (ONE) MARK WILL BE DEDUCTED FOR EACH WRONG / INCORRECT ANSWER.**
8. There is/are extra blank page/s at the end of this booklet for rough work. The sheet should not be torn out from the Test Booklet.
9. **Candidates are not allowed to use Calculator, Pager and Mobile Phone or any other type of electronic gadget of communication in the Examination Hall.**
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11. ***You are warned against adoption of any unfair means at the examination. Any report in this behalf from Centre Supervisors or Examiners may lead to instant cancellation of your examination and debarment from appearing in future examinations/selections.***

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1. **In english bond Queen closer is placed**
   (A) In header course
   (B) In stretcher course
   (C) In header course next to a quoin
   (D) In stretcher course in any position

2. **A portion of beam between two sections is said to be under pure bending when there is**
   (A) Constant bending moment and zero shear force
   (B) Zero shear force only
   (C) Constant shear force and zero bending moment
   (D) Constant shear force and bending moment

3. **The load carrying capacity of a helically reinforced column as compared to that of tied column is about**
   (A) 10% less
   (B) 10% more
   (C) 5% less
   (D) 5% more

4. **The centre of gravity of a 10 × 12 × 2 cm "T" section from bottom is**
   (A) 4 cm
   (B) 8 cm
   (C) 8.27 cm
   (D) 9.5 cm

5. **The bending moment diagram for a cantilever beam sbject to a moment at the free end is**
   (A) A triangle
   (B) A rectangle
   (C) A parabola
   (D) A cubic parabola

6. **Pick up the metamorphic rock from the following**
   (A) Marble
   (B) Gneiss
   (C) Slate
   (D) All of these

7. **Which one of the following is taken into consideration for computing traffic capacity per lane of the highway?**
   (A) Passenger cars and light vehicles
   (B) Trucks and buses
   (C) Two-wheelers
   (D) Equivalent of passenger cars

8. **Ozone is formed in atmosphere due to the action of**
   (A) Ultraviolet rays on oxygen
   (B) Infrared rays on oxygen
   (C) Gamma rays on oxygen
   (D) X-rays on oxygen

9. **Turbidity is measured in**
   (A) Standard Cobalt scale
   (B) Standard Silica scale
   (C) Standard Platinum scale
   (D) None of these

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10. **For W.B.M roads in localities of heavy rainfall, the recommended value of camber is**
(A) 1 in 30
(B) 1 in 36
(C) 1 in 48
(D) 1 in 60

11. **Compared to a level surface, on a descending gradient the stopping sight distance is**
(A) Less
(B) More
(C) Same
(D) Depended on the speed

12. **Which of the following shapes is preferred in a valley curve?**
(A) Simple parabola
(B) Cubic parabola
(C) Spiral
(D) Lemniscate

13. **The maximum width of a vehicle as recommended by IRC is**
(A) 1.85 m
(B) 2.44 m
(C) 3.81 m
(D) 4.72 m

14. **The background colour of the informatory sign board is**
(A) Red
(B) Yellow
(C) Green
(D) White

15. **Bitumen of grade 80/100 means**
(A) Its penetration value is 8 mm
(B) Its penetration value is 10 mm
(C) Its penetration value is 8 to 10 mm
(D) Its penetration value is 8 to 10 cm

16. **The direct interchange ramp involves**
(A) Diverging to the right side and merging from left
(B) Diverging to the left side and merging from right
(C) Diverging to the right side and merging from right
(D) Diverging to the left side and merging from left

17. **A traffic rotary is justified where**
(A) Number of intersecting roads is between 4 and 7
(B) Space is limited and costly
(C) When traffic volume is less than 500 vehicles per hour
(D) When traffic volume is more than 5000 vehicles per hour

18. **Gantry girders are designed to resist**
(A) Lateral loads
(B) Longitudinal loads and vertical loads
(C) Lateral, longitudinal and vertical loads
(D) Lateral and longitudinal loads

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19. **The Le-Chatlier test is done for cement to ascertain**
(A) Normal consistency
(B) Setting time
(C) Strength
(D) Soundness

20. **The amount which has to be set aside at fixed intervals from gross income so that at the end of life of the property the fund should accumulate to the initial cost is called**
(A) Recurring deposit
(B) Year's purchase
(C) Sinking fund
(D) Secured fund

21. **Separation of coarse aggregates from mortar during placing is known as**
(A) Bleeding
(B) Segregation
(C) Creeping
(D) Shrinkage

22. **The loss of Property due to change in fashions, designs, inadequacy to growing needs, necessity for replacement due to new inventions is known as**
(A) Appreciation
(B) Depreciation
(C) Obsolescence
(D) Amortization

23. **The centre of gravity of a plane lamina is not at its geometrical centre if it is a**
(A) Circle
(B) Square
(C) Rectangle
(D) Right angled triangle

24. **A line measured with a 30m chain is 300m. The chain was 10 cm too long. The actual length of the line is**
(A) 299 m
(B) 300 m
(C) 301 m
(D) 300.1 m

25. **Magnetic bearing of a line is 10° at a place where magnetic declination is 2° west then the true bearing of the line is**
(A) 2°
(B) 12°
(C) 10°
(D) 8°

26. **Penetration test on bitumen is used for determining its**
(A) Grade
(B) Viscosity
(C) Ductility
(D) Temperature susceptibility

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27. **Reading of a metric levelling staff can be taken accurately up to**
(A) 0.01 m
(B) 0.05 m
(C) 0.001 m
(D) 0.005 m

28. **For testing compressive strength of cement size of cube used is**
(A) 150 mm
(B) 106 mm
(C) 76.6 mm
(D) 70.6 mm

29. **Withing the elastic limit the ratio of lateral strain to longitudinal strain is called**
(A) Bulk modulus
(B) Modulus of rigidity
(C) Poisson's ratio
(D) Young's modules

30. **For 10 M^3 cement concrete (1:3:6) cement required in bags is**
(A) 48
(B) 45
(C) 42
(D) 40

31. **The water content in percentage of a fully saturated soil sample having voids ratio 0.75 and sp.gr. 2.5 will be**
(A) 0.3
(B) 3
(C) 30
(D) 300

32. **If d is the value of the smallest division of the main scale and v is the value of the smallest division of the vernier scale then least count of the vernier is**
(A) d/v
(B) v/d
(C) d-v
(D) v-d

33. **Fresh sewage is usually**
(A) Alkaline
(B) Acidic
(C) Neutral
(D) pH value of 7

34. **If the depth of a simply supported beam is doubled for the same load the deflection at the centre will be**
(A) Same
(B) 1/2
(C) 1/4
(D) 1/8

35. **The property of a fresh concrete in which the water in the mix tends to rise to the surface while placing and compacting is called**
(A) Segregation
(B) Bleeding
(C) Bulking
(D) Creep

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36. **Maximum distance between expansion joints in structures as per IS 456-2000 is**
(A) 20 m
(B) 30 m
(C) 45 m
(D) 60 m

37. **In reinforced concrete footing on soil, the minimum thickness at edge should not be less than**
(A) 10 cm
(B) 15 cm
(C) 20 cm
(D) 25 cm

38. **The maximum size of clay particle is**
(A) 0.1 mm
(B) 0.03 mm
(C) 0.002 mm
(D) 0.0002 mm

39. **Sieve analysis of a soil sample is done if the particles do not pass through square openings of**
(A) 0.075 mm
(B) 0.15 mm
(C) 4.75 mm
(D) 0.3 mm

40. **Gauge is the distance between**
(A) Centre to centre of rails
(B) Running faces of rails
(C) Outer faces of rails
(D) None of the above

41. **Strain energy in a member is**
(A) Directly proportional to strains only
(B) Directly proportional to stress only
(C) a function of stress as well as strain
(D) A function of load only

42. **The bond strength of concrete increases with**
(A) The quantity of steel
(B) The quality of concrete
(C) The tensile strength of steel
(D) All the above

43. **In R.C.C. beams, the end cover of concrete should not be less than**
(A) Diameter of the bar
(B) Twice the diameter of the bar
(C) Diameter of the hook provided
(D) Four times the diameter of the bar

44. **The type of weld used for joining two surfaces approximately at right angles to each other is known as**
(A) Fillet weld
(B) W groove weld
(C) Double V groove weld
(D) Single J butt joint

45. **The failure of column depends upon**
(A) Critical load
(B) Crippling load
(C) Buckling load
(D) Any one of the above

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46. **Which of the following types of rivetted joints is free from bending stress?**
(A) Lap joint
(B) Butt joint with single cover plate
(C) Butt joint with double cover plate
(D) None of the above

47. **Bolts are most suitable to carry**
(A) Shear
(B) Bending
(C) Axial tension
(D) Shear and bending

48. **In the cross-section of a weld, throat is the**
(A) Minimum dimension
(B) Average dimension
(C) Maximum dimension
(D) None of the above

49. **In an under-reinforced section**
(A) Concrete is not fully stressed to its permissible stress
(B) Steel reinforcement is not fully stressed
(C) Either (A) and (B)
(D) Both (A) and (B)

50. **Generally the purlins are placed at the panel points so as to avoid**
(A) Axial force in rafter
(B) Shear force in rafter
(C) Deflection of rafter
(D) Bending moment in rafter

51. **A structural member subjected to compressive force in a direction parallel to its longitudinal axis, is called**
(A) Column
(B) Post
(C) Stanchion
(D) Anyone of the above

52. **Maximum slenderness ratio of a compression member which carry loads resulting fromwind or Seismic forces only, is**
(A) 180
(B) 250
(C) 300
(D) 350

53. **In a cantilever beam, the maximum deflection of the beam should not be greater than**
(A) $\frac{l}{180}$
(B) $\frac{l}{120}$
(C) $\frac{l}{360}$
(D) $\frac{l}{240}$

54. **A pin-jointed plane frame is unstable if**
(A) $(m+r) < 2j$
(B) $m+r = 2j$
(C) $(n+r) > 2j$
(D) None of the above

Where 'm' is number of members, 'r' is reaction components and 'j' is number of joints.

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55. **Pandrol clips cannot be used with**
(A) Wooden sleepers
(B) Concrete sleepers
(C) CST-9 sleepers
(D) Steel trough sleepers

56. **Normally the limiting value of cant is**
(A) G/8
(B) G/10
(C) G/12
(D) G/15

57. **Coning of wheel is provided**
(A) To check lateral movements of wheel
(B) To avoid damage to inner faces of wheels
(C) To avoid discomfort of passengers
(D) All the above

58. **The fixed rail in railway track against which the tongue rail fits in known as**
(A) Stock rail
(B) Lead rail
(C) Wing rail
(D) Point rail

59. **The ratio between the total volume of voids and the total volume of solids is called**
(A) Porosity
(B) Void fraction
(C) Void ratio
(D) Solid ratio

60. **A soil sample has a porosity of 40% the specific gravity of solids is 2.70. The void ratio for the sample is**
(A) 0.250
(B) 0.667
(C) 0.75
(D) 0.8

61. **A soil having uniformity coefficient more than 10, is called**
(A) Uniform soil
(B) Poor soil
(C) Well graded soil
(D) Coarse soil

62. **In moment distribution method the sum of distribution factors of all the members meeting at any joint is always**
(A) Zero
(B) Less than 1
(C) 1
(D) Greater than 1

63. **The reduction in project time normally results in**
(A) Decreasing the direct cost and increasing indirect cost
(B) Increasing the direct cost and decreasing the indirect cost
(C) Increasing the direct cost and indirect cost both
(D) Decreasing the direct cost and indirect cost both

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64. **The relation between Young's modulus E, Bulk modulus K and Poisson's ratio μ is**
(A) E=2K(1-2μ)
(B) E=2K(1+μ)
(C) E=3K(1-μ)
(D) E=3K(1-2μ)

65. **A flow in which each liquidparticle has definite path and the paths of individual particles do not cross each other is called**
(A) Laminar flow
(B) Steady flow
(C) Uniform flow
(D) Turbulent flow

66. **Line concrete on roof terracing is measured in**
(A) rm
(B) sqm
(C) cum
(D) All of the above

67. **Point of contra flexure is the point where**
(A) Shear force changes sign
(B) Share force is zero
(C) Bending moment changes sign
(D) Bending moment is maximum

68. **Due to attack of dry rot, the timber**
(A) Cracks
(B) Shrinks
(C) Twists
(D) Has no effect

69. **For taking a oblique offset which makes an angle of 45° with the chain line the instrument used is**
(A) Open cross stuff
(B) Optical square
(C) French cross stuff
(D) Adjustable cross staff

70. **In specification of earthwork in foundation trenches, drains etc. lift ordinarily specified is**
(A) 30 m
(B) 1.5 m
(C) 5 m
(D) 3 m

71. **Planimeter used for measuring**
(A) Area
(B) Volume
(C) Bearing
(D) Contour gradient

72. **Abrasion test is conducted to find**
(A) Strength of aggregate
(B) Hardness of aggregate
(C) Toughness of aggregate
(D) Durability of aggregate

73. **The value of property that can be obtained at any particular time from open market when the property is put for sale is known as**
(A) Current value
(B) Real value
(C) Market value
(D) Book value

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74. **As per IS 456-2000 the minimum reinforcement in a long column is**
(A) 0.8%
(B) 1%
(C) 3%
(D) 6%

75. **The back sight reading over a BM of RL 100 m is 1.75 m. and foresight reading on a point is 2.25 m. The RL of the point will be**
(A) 100.5m
(B) 101.75m
(C) 99.5m
(D) 97.75m

76. **A simply supported beam of length 'l' carries two equal concentrated load 'w' at a distance 1/3 from each support. The value of a maximum BM will be**
(A) 2wl/3
(B) wl/3
(C) wl/6
(D) wl/12

77. **Black cotton soil is unsuitable for foundation because of its**
(A) Low bearing capacity
(B) Uncertain permeability
(C) Cohesive particles
(D) Property to undergo a volumetric change due to variation of moisture content

78. **If Quadrantal bearing of a line is N 5° 42′ w the corresponding whole circle bearing of the line will be**
(A) 354°18'
(B) 275°42'
(C) 185°42'
(D) 184°18'

79. **Granite is an example of**
(A) Aqueous rock
(B) Metamorphic rock
(C) Sedimentary rock
(D) Igneous rock

80. **The maximumslope of a cantilever beam of length 'l' carrying a point load 'w' at a distance 1/3 from free end**
(A) $wl^2/9EI$
(B) $2wl^2/9EI$
(C) $wl^2/2EI$
(D) $9wl^2/2EI$

81. **The bulk density in kN/m^3 of a soil having water content 10% and dry density of $20kN/m^3$ will be**
(A) 18.18
(B) 20.1
(C) 22
(D) 21.1

82. **Revised estimate is prepared if the sanctioned estimate is exceeded by**
(A) 2.5%
(B) 5%
(C) 7.5%
(D) 10%

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83. An isobar is a line which connects all points below the ground surface at which

(A) The local ground elevation is same
(B) The settlement is same
(C) The vertical stress is same
(D) The ground elevation is same

84. The maximum water content at which a reduction in water content will not cause a decrease in volume of a soil mass is known as

(A) Plastic limit
(B) Shrinkage limit
(C) Liquid limit
(D) Consistency limit

85. Bearing capacity of soil is determined at the site by conducting test such as

(A) Plate load test
(B) Dynamic penetration test
(C) Both of the above
(D) None of the above

86. The type of foundation suitable for under water structures is

(A) Cast in situ concrete piles
(B) Continuous footing
(C) Pier foundation
(D) Stepped foundation

87. Along a phreatic line in an earth dam

(A) The total head is constant but not zero
(B) The total head is everywhere zero
(C) The pressure head is everywhere zero
(D) None of the above

88. Magnetic declination at a point

(A) Does not change with climate
(B) Remains constant
(C) Varies with time
(D) All the above

89. Lap length in compression shall not be less than

(A) 15ϕ
(B) 20ϕ
(C) 24ϕ
(D) 30ϕ

90. Which of the following statements is incorrect?

(A) Higher vee-bee times shows lower workability
(B) Higher slump shows higher workability
(C) Higher compacting factor shows higher workability
(D) None of the above

91. Critical path

(A) Is always longest
(B) Is always shortest
(C) May be longest
(D) May be shortest

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92. **The horizontal angle between the true meridian and a line is known as**
(A) Bearing
(B) Azimuth
(C) Declination
(D) Dip

93. **The ratio of width to depth of a strongest beam that can be cut out from a cylindrical log of wood is**
(A) 1/2
(B) 1/3
(C) $1/\sqrt{2}$
(D) $\sqrt{2}$

94. **The reduced level of a floor is 90m the staff reading on the floor is 1.585m and the inverted staff reading against the roof is 1.715m. Then the RL of the ceiling is**
(A) 93.3m
(B) 90.13m
(C) 91.715m
(D) 91.585m

95. **The equilibrium super elevation required to counteract the centrifugal force fully is given by**
(A) $v^2/27.5R$
(B) $v^2/75R$
(C) $(0.75v)^2/127R$
(D) $v^2/127R$

96. **Gypsum is added in cement for**
(A) Colour
(B) Strength
(C) Controlling setting time
(D) None of these

97. **In rolled steel beams shear force is mostly resisted by**
(A) Web only
(B) Flange only
(C) Both web and flange
(D) None of these

98. **To eliminate collimation error the levelling instrument must be placed**
(A) Near BS
(B) Near FS
(C) Midpoint between BS and FS
(D) Small distance apart from BS and FS

99. **The representative fraction 1/1,00,000 signifies a scale of**
(A) 1 cm = 1000000 m
(B) 1 cm = 1 km
(C) 1 cm = 10 km
(D) 1 cm = 100 km

100. **When a shaft is subjected to pure twisting the type of stress developed in the shaft is**
(A) Bending stress
(B) Axial stress
(C) Hoop stress
(D) Shear stress

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