WB Municipal Service Commission Sub AE

Previous Year Paper

(Civil) 2015

Do not open this Booklet until you are asked to do so

2016
Test Booklet
MCSE

Time allowed : 2 hours
Full marks : 200
Questions are of equal Mark

BOOKLET GROUP

D

Roll No. .....

Full Signature of the Candidate : .....

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.**
10. **The Entire Set (Answer-Sheet & Test Booklet including used/unused extra pages) should be handed over to the Invigilator before leaving the Examination Hall.**
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. **The deflection at the free end of a uniformly loaded cantilever of length 1m is 7.5 mm. The slope at the free end is**
   (A) 0.011 radian
   (B) 0.015 radian
   (C) 0.02 radian
   (D) 0.025 radian

2. **The radio of moment carrying capacity of a circular beam of diameter 'D' and square beam of size 'D' is**
   (A) $\pi/3$
   (B) $\pi/4$
   (C) $3\pi/8$
   (D) $3\pi/16$

3. **If s is the shear strength, c and φ are shear strength parameter and σ_n is the normal stress at failure, then coulomb's equation for shear strength of soil is**
   (A) $c = s + \sigma_n \tan\varphi$
   (B) $c = s - \sigma_n \tan\varphi$
   (C) $s = \sigma_n + c \tan\varphi$
   (D) $s = c - \sigma_n \tan\varphi$

4. **The residual by product of the destructive distillation of coal is known as**
   (A) Asphalt
   (B) Tar
   (C) Bitumen
   (D) Cutback

5. **Bureau of Indian Standards classifies bitumen into grades 65/25, 85/40 etc. The 1st and 2nd numbers respectively refers to**
   (A) Softening point and penetration
   (B) Penetration and softening point
   (C) Flash point and penetration
   (D) Flash point and softening point

6. **The carbon content of structural steel is**
   (A) Less than 0.1%
   (B) 0.1% to 0.25%
   (C) 0.25% to 0.60%
   (D) 0.6% to 1.00%

7. **Plastic bitumen is generally used for**
   (A) Crack filling
   (B) Expansion joints
   (C) Road pavements
   (D) None of these

8. **Brass is an alloy of**
   (A) Mild steel and copper
   (B) Zinc and copper
   (C) Copper and lead
   (D) Zinc and nickel

9. **A propped cantilever of span 4 m is fixed at A and propped at B carries a UDL of 1 KN/m over the entire span. The prop reaction is**
   (A) 2.5 KN
   (B) 2 KN
   (C) 1.5 KN
   (D) 1 KN

10. **For a circular column having both ends hinged the slenderness ratio is 160, the $\frac{l}{d}$ ratio of the column is**

(A) 80
(B) 60
(C) 40
(D) 20

11. **The bearing of C from A is N30°E and from B which is 50m east of A, is N60°W. The departure of C from A is**

(A) 43.3 m
(B) 25 m
(C) 14.43 m
(D) 12.5 m

12. **The radius of a simple circular curve is 300 m and length of it's specified chord is 30 m. The degree of the curve is**

(A) 5°37'
(B) 5°73'
(C) 3°57'
(D) 3°75'

13. **Indian Road Congress was founded and constituted with its headquarters at New Delhi in**

(A) 1924
(B) 1930
(C) 1934
(D) 1942

14. **A retaining wall retains a sand strata with $\varphi = 30°$ upto top. If a uniform surcharge load of 120 KN/m^2 is put on the sand strata, then the increase in the lateral earth pressure intensity on the wall will be**

(A) 10 KN/m^2
(B) 20 KN/m^2
(C) 40 KN/m^2
(D) 80 KN/m^2

15. **The maximum shear stress of rectangular beam of width 100 mm and subjected to a maximum shear force of 60 KN, is 4 N/mm^2. The depth of the beam is**

(A) 150 mm
(B) 225 mm
(C) 200 mm
(D) 250 mm

16. **A simply supported beam of 'T' section having total depth of 100 mm and depth of N.A. at 25 mm from top of the flange, is subjected to a u.d.l.. The ratio of maximum tensile stress to maximum compressive stress in the beam is**

(A) 3
(B) 2.5
(C) 2
(D) 1.5

17. **The effective length of a weld is taken as the actual length**
(A) Minus the size of the weld
(B) Plus the size of the weld
(C) Minus twice the size of the weld
(D) None of these

18. **As per IRC the camber on cement concrete road should be**
(A) 1 in 60 to 50
(B) 1 in 45 to 60
(C) 1 in 20 to 24
(D) 1 in 12 to 16

19. **If base period is 100 days and the duty of the canal is 1000 hectares per cumec, the delta of crop will be**
(A) 0.864 cm
(B) 8.64 cm
(C) 86.4 cm
(D) 864 m

20. **The trap used for water closet is called**
(A) Gully trap
(B) P-trap
(C) Intercepting trap
(D) Antisiphon trap

21. **What is the most common cause of acidity in water?**
(A) Carbon monoxide
(B) Nitrogen
(C) Hydrogen
(D) Carbon dioxide

22. **A beam ABCD 10 m long simple supported at B and C at 6 m apart with equal overhang AB and CD of each 2 m. A point load of 12 KN is applied at A and 'W' at D. The magnitude of reaction at C will be zero if the value of 'W' is**
(A) 2 KN
(B) 2.5 KN
(C) 3 KN
(D) 6 KN

23. **Which one of the following aggregates gives maximum strength of concrete?**
(A) Rounded aggregate
(B) Elongated aggregate
(C) Flaky aggregates
(D) Cubical aggregate

24. **As per IS code of practice concrete should be cured at**
(A) 5°c
(B) 10°c
(C) 27°c
(D) 40°c

25. **Carpet area does not include the area of**
(A) Verandah, corridor and passage
(B) Kitchen, pantry and lavatory
(C) Walls, bathroom and storeroom
(D) All the above

26. Out of two beams of same material and same cross sectional area, one is of circular section and other is of square section and each subjected to same bending moment, then

(A) Both sections will be equally strong
(B) Square section would be more economical than circular section
(C) Circular section would be more economical than square section
(D) Both sections would be equally economical

27. Mastic asphalt is

(A) Acid resisting material
(B) Corrosive material
(C) Heat resisting material
(D) Non corrosive material

28. Dorry's testing machine is used for

(A) Crushing test of stone
(B) Impact test of stone
(C) Hardness test of stone
(D) None of these

29. The presence of sand in brick earth presents

(A) Warping of bricks
(B) Cracking of bricks
(C) Shrinkage of bricks
(D) None of these

30. For complete hydration of cement the water cement ratio needed is

(A) Less than 0.25
(B) More than 0.25 but less than 0.35
(C) More than 0.35 but less than 0.45
(D) More than 0.45 but less than 0.6

31. Gypsum is used as an admixture in cement grouts for

(A) Accelerating the setting time
(B) Retarding the setting time
(C) Increasing the plasticity
(D) Retarding the grout shrinkage

32. The raw materials used for manufacturing of high alumina cement are

(A) Lime stone and bauxite
(B) Limestone, bauxite and gypsum
(C) Limestone, gypsum and clay
(D) Limestone, bauxite, gypsum and clay

33. The ratio of maximum shear stress to average shear stress for a circular section is

(A) 2
(B) 2/3
(C) 4/3
(D) 3/4

34. **One of the main demerits in using the lime mortar is that it**

(A) is not durable
(B) does not set quickly
(C) swells
(D) is plastic

35. **Lime mortar is generally made with**

(A) quick lime
(B) fat lime
(C) hydraulic lime
(D) white lime

36. **The approximate ratio of strength of 15 cm × 30 cm concrete cylinder to that of 15 cm cube of the same concrete is**

(A) 0.5
(B) 0.85
(C) 1
(D) 1.25

37. **A beam of length 10 m carries a u.d.l. of 20 KN/m over it's entire length and rests on two simple supports with equal overhang at both ends. In order that maximum B.M. produced in the beam is the least possible, the supports must be placed from the ends at a distance of**

(A) 2.86 m
(B) 2.93 m
(C) 2.54 m
(D) 2.07 m

38. **From ecological considerations, the minimum level of dissolved oxygen (DO) necessary in the rivers and stream is**

(A) 1 mg/l
(B) 2 mg/l
(C) 4 mg/l
(D) 8 mg/l

39. **The water content in percentage to fully saturate soil sample having specific gravity of 2.6 and void ratio of 0.78 is**

(A) 10
(B) 30
(C) 50
(D) 70

40. **The value of porosity of a soil sample having volume of soil grains is twice the volume of voids would be**

(A) 75%
(B) 66.66%
(C) 50%
(D) 33.33%

41. **Quantity of cement (in kg) and dry sand (in cubic meter) respectively required for preparing 1 cubic meter of wet cement mortar of 1:5 proportion**

(A) 270 and 1
(B) 290 and 1.05
(C) 310 and 1.08
(D) 320 and 1.1

42. **As per IS 456 2000 the limits of percentage of the longitudinal reinforcement in column is**

(A) 0.15% to 2%
(B) 0.8% to 4%
(C) 0.8% to 6%
(D) 0.8% to 8%

43. **An isosceles triangular plate of base 3 m and altitude 3 m is immersed vertically in oil of specific gravity of 0.8, base being coincide with the free surface of oil. The center of pressure will lie from oil surface at a distance of**

(A) 1 m
(B) 1.5 m
(C) 2 m
(D) 2.5 m

44. **Water present in an artesian aquifer is usually**

(A) At sub atmospheric pressure
(B) At atmospheric pressure
(C) At 0.5 times of the atmospheric pressure
(D) Above atmospheric pressure

45. **Angle between the principal strain axis and maximum shear strain axis is**

(A) 0°
(B) 30°
(C) 45°
(D) 90°

46. **A beam simply supported at both ends of length 'l' carries two unlike couples 'M' at the two ends. If the flexural rigidity EI is constant then the central deflection of the beam is**

(A) $Ml^2/4EI$
(B) $Ml^2/16EI$
(C) $Ml^2/64EI$
(D) $Ml^2/8EI$

47. **A simply supported beam 'A' carries a point load at it's mid span. Another identical beam 'B' carries the same magnitude of load but it is uniformly distributed over the entire span. The ratio of the maximum deflections of beams 'A' and 'B' will be**

(A) 3/5
(B) 8/5
(C) 8/3
(D) 2/3

48. **The natural void ratio of saturated clay strata of 3 m thick is 0.90. The final void ratio of the clay at the end of consolidation is 0.71, then total settlement of the strata is**

(A) 30 cm
(B) 25 cm
(C) 20 cm
(D) 15 cm

49. A well-seasoned timber has a moisture content of about

(A) 15% to 20%
(B) 10% to 12%
(C) 5% to 8%
(D) 2% to 3%

50. The approximate proportion of dry cement mortar required for brickwork is

(A) 60%
(B) 45%
(C) 35%
(D) 25%

51. The bulk modulus of elasticity of a material is twice it's modulus of rigidity. The poisson's ratio of the material is

(A) 1/7
(B) 2/7
(C) 3/7
(D) 4/7

52. Which one of the following solid waste disposal methods is ecologically most acceptable

(A) Sanitary landfill
(B) Composting
(C) Incineration
(D) Pyrolysis

53. CBR test is a type of

(A) Shear test
(B) Bearing test
(C) Penetration test
(D) None of these

54. A solid bar of uniform dia 'D' and length 'L' is hung vertically from ceiling. If density of material is 'ρ' and modulus of elasticity is 'E', then the total elongation of the bar due to it's own weight is

(A) $\frac{\rho L}{2E}$
(B) $\frac{\rho L^2}{2E}$
(C) $\frac{\rho E}{2L}$
(D) $\frac{\rho E}{2L^2}$

55. Asphalt is obtained from

(A) Petroleum distillation
(B) Bitumen distillation
(C) Plastic distillation
(D) None of these

56. The bar of dia 30 mm is subjected to a tensile load such that the measured extension on a gauge length of 200 mm is 0.09 mm and change in dia is 0.0045 mm, the poisson's ratio will be

(A) 1/4
(B) 1/3
(C) 1/5
(D) 1/6

57. Imhoff cone is used to measure

(A) Settelable solids
(B) Total organic solids
(C) Total dissolved solids
(D) None of these

58. In limit state design, permissible bond stress in the case of deformed bars is more than that in plain bars by

(A) 25%
(B) 40%
(C) 50%
(D) 60%

59. Ultimate strength of cement is influenced by

(A) Tricalcium silicate
(B) Dicalcium silicate
(C) Tricalcium aluminate
(D) Tetracalciumalumino ferrite

60. Which type of cement is recommended in large mass concrete works such as

(A) Ordinary Portland
(B) High alumina
(C) Low heat Portland
(D) Portland pozzolona

61. Fineness of cement is measured inthe units of

(A) Area/mass
(B) Mass/area
(C) Volume/mass
(D) Mass/volume

62. For determination of average annual precipitation in a catchment basin, the best method is

(A) Arithmethical method
(B) Thiessen's mean method
(C) Isohyetal method
(D) None of these

63. A circular sewer section is preferred to because

(A) It is lighter in weight
(B) It is structurally strong to bear large compressive stress
(C) It provides maximum area for a given perimeter
(D) All the above

64. The coagulant widely used for sewage treatment is

(A) Alum
(B) Ferric chloride
(C) Ferric sulphate
(D) Chlorinated copperas

65. The fineness of the cement is tested by

(A) Air content method
(B) Air permeability method
(C) Le chatelier apparatus
(D) Vicat's apparatus

66. The permissible stress in axial tension in structural steel as per IS 800-1984

(A) $0.45f_y$
(B) $0.6\ f_y$
(C) $0.66\ f_y$
(D) $0.8\ f_y$

67. As per IS 456-2000, the modulus of elasticity of concrete is

(A) $0.7\sqrt{f_{ck}}$
(B) $500\sqrt{f_{ck}}$
(C) $5000\sqrt{f_{ck}}$
(D) $5700\sqrt{f_{ck}}$

68. **Seasoning of timber is required to**
(A) Soften the timber
(B) Harden the timber
(C) Straighten the timber
(D) Remove sap from the timber

69. **Polyvinyl chloride (PVC) is a**
(A) Thermosetting material
(B) Thermoplastic material
(C) Elastoplastic material
(D) Rigid plastic material

70. **As per IS specification the minimum compressive strength of a first class brick should be**
(A) 5 N/mm^2
(B) 7.5 N/mm^2
(C) 10 N/mm^2
(D) 12.5 N/mm^2

71. **The maximum depth of neutral axis for a beam of effective depth 'd' in limit state method of design with Fe 415 is**
(A) 0.48 d
(B) 0.50 d
(C) 0.53 d
(D) 0.60 d

72. **The minimum reinforcement in a slab with Fe 415 steel is**
(A) 0.10%
(B) 0.12%
(C) 0.15%
(D) 0.2%

73. **If the principal stresses at a point in a stressed body are 150 KN/m^2 tensile and 50 KN/m^2 compressive, then maximum shear stress at this point will be**
(A) 100 KN/m^2
(B) 150 KN/m^2
(C) 200 KN/m^2
(D) 250 KN/m^2

74. **A wet cohesive subgrade is most effectively stabilized by the addition of**
(A) Cement
(B) Fly ash
(C) Bitumen
(D) Lime

75. **A 30 m chain is found to be 10 cm too short during measurement. If the measured distance of a line with the tape is 300 m then actual distance will be**
(A) 300.1 m
(B) 301 m
(C) 299 m
(D) 310 m

76. **If FB of AB is 30°15' and BB of BC is 300°30', then the included angle $< ABC$ will be**
(A) 89°45'
(B) 90°15'
(C) 229°45'
(D) 269°45'

77. **A beam ABCD 12 m long simply supported at B and C 8 m apart with equal overhang of 2 m on both end is subjected to a u.d.l. of 100 KN/m. The B.M. for which the beam is to be designed is**

(A) 200 KNm
(B) 600 KNm
(C) 640 KNm
(D) 800 KNm

78. **For shear force to be uniform throughout the span of a simply supported beam, which of the following loads should be applied on the beam**

(A) Two equally spaced concentric loads
(B) A couple at the mid span only
(C) U.D.L. over the entire span
(D) A couple anywhere in the span

79. **At a point in a strained material, if two mutually perpendicular tensile stresses of 200 N/mm^2 and 100 N/mm^2 are acting, then the intensity of tangential stress on a plane inclined at 15° to the axis of the minor stress will be**

(A) 12.5 N/mm^2
(B) 25 N/mm^2
(C) 50 N/mm^2
(D) 100 N/mm^2

80. **If the total hardness and alkalinity of a sample of water are 300 mg/l and 100 mg/l ($CaCO_3$ scale) respectively, then it's carbonate and non-carbonate hardness (in units of mg/l) will be respectively**

(A) 100 and 200
(B) 100 and 400
(C) 400 and 300
(D) 400 and zero

81. **The amount of bleaching powder containing 20% available chlorine needed per day to chlorinate a raw water supply of 50 lpcd at the rate of 2 ppm for a population of 10000 is**

(A) 0.2 kg
(B) 1 kg
(C) 5 kg
(D) 20 kg

82. **In water treatment plant, dissolved iron and manganese can be removed from the water by**

(A) Aeration
(B) Aeration and coagulation
(C) Aeration and flocculation
(D) Aeration and sedimentation

83. **A median is a longitudinal space separating**

(A) Dual carriage way
(B) Roadway and shoulder
(C) Footpath and carriage way
(D) Two intersections

84. **The maximum energy stored at elastic limit of a material is called**
(A) Resilience
(B) Proof resilience
(C) Modulus of resilience
(D) Bulk resilience

85. **In terms of bulk modulus(K) and modulus of rigidity(G), poisson's ratio can be expressed as**
(A) $\frac{3k-4G}{6k+4G}$
(B) $\frac{3k+4G}{6k-4G}$
(C) $\frac{3k-2G}{6k+2G}$
(D) $\frac{3k+2G}{6k-2G}$

86. **Distemper is used to coat**
(A) External concrete surfaces
(B) Interior surfaces not exposed to weather
(C) Wood work
(D) Compound walls

87. **The branch of surveying in which horizontal and vertical distances are determined by taking instrumental observations without chaining operations**
(A) Theodolite survey
(B) Geodetic survey
(C) Hydrographic survey
(D) Tacheometric survey

88. **In water bound macadam road, binding material is**
(A) Stone dust
(B) Sand
(C) Bitumen
(D) Brick dust

89. **The minimum width of the pavment of a National Highway should be**
(A) 8.7 m
(B) 7.7 m
(C) 6.7 m
(D) 5.7 m

90. **If v is the speed of a running vehicle, R is the radius of curve, g is the acceleration due to gravity, w is the widthof the carriage way, then the super elevation is**
(A) $\frac{wv}{gR}$
(B) $\frac{wv^2}{gR}$
(C) $\frac{w^2v}{gR}$
(D) $\frac{wv}{gR^2}$

91. **The shear stress distribution over a rectangular cross section of a beam follows**
(A) A straight line path
(B) A circular path
(C) A parabolic path
(D) An elliptical path

92. **Imaginary line passing through points having equal magnetic declination is termed as**
(A) Isogonic line
(B) Agonic line
(C) Isoclinic line
(D) None of these

93. **As the distance between the tacheometer and staff increases, the staff intercept by stadia hair**
(A) Decreases
(B) Increases
(C) Remains constant
(D) Varies with duration of reading

94. **The surface of still water is considered to be**
(A) Smooth
(B) Horizontal
(C) Level
(D) Undulated

95. **The pavement which posses considerable flexural strength are known as**
(A) Rigid pavement
(B) Flexible pavement
(C) Semi rigid pavement
(D) Ordinary pavement

96. **The maximum design gradient for vertical profile of a road is**
(A) Exceptional gradient
(B) Limiting gradient
(C) Minimum gradient
(D) Rulling gradient

97. **A hollow circular column of internal diameter d and external diameter 1.5d is subjected to compressive load. The maximum distance of the point of application of load from the centre for no tension is**
(A) d/8
(B) 13d/48
(C) d/4
(D) 13d/96

98. **For a masonry dam of base width b, the location with respect to the centre line the resultrant loading interesects the section for no tension at base is**
(A) within b/3
(B) within b/2
(C) within b/6
(D) within b/8

99. **As per Terzaghi's equation, the net bearing capacity of strip footing resting on cohesive soil (c=10 KN/m^2) for unit depth and width (take Nc=5.7) is**
(A) 47 KN/m^2
(B) 57 KN/m^2
(C) 67 KN/m^2
(D) 77 KN/m^2

100. **For carrying out bituminous patch work during the rainy season, the most suitable binder is**
(A) Road tar
(B) Hot bitumen
(C) Cutback bitumen
(D) Bituminous emulsion