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1. If a composite bar of steel and copper is heated, then the copper bar will be under
a. tension
b. compression
c. shear
d. torsion

2. In a riveted connection shown in Fig. 10.2, which of the rivets will be subjected to maximum stress?

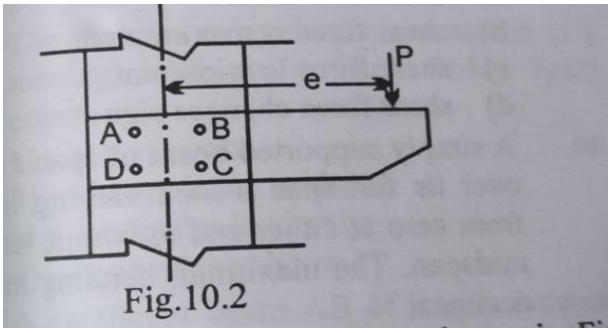

Fig.10.2

a. rivet A only
b. rivets B and D
c. rivets C and D
d. rivets A and C

3. The sum of normal stresses is
a. constant
b. variable
c. dependent on the planes
d, none of the above

4. The radius of Mohr's circle for two equal unlike principle stresses of magnitude p is
a. p
b. p/2
c. zero
d. none of the above

5. The diagram showing the variation of axial load along the span is called
a. shear force diagram
b. bending moment diagram
c. thrust diagram
d. influence line diagram

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6. A beam of uniform strength has at every cross-section same
a. bending moment
b. bending stress
c. deflection
d. stiffness

7. Two beams, one of circular cross-section and other of square cross-section, have equal areas of cross-section. If subjected to bending
a. circular section is more economical
b. square section is more economical
c. both sections are equally strong
d. both sections are equally stiff

8. A simply supported beam with rectangular cross-section is subjected to a central concentrated load. If the width and depth of the beam are doubled, then the deflection at the centre of the beam will be reduce to
a. 50%
b. 25%
c. 12.5%
d. 6.25%

9. A laminated spring is supported at
a. ends and loaded at centre
b. centre and loaded at ends
c. ends and loaded anywhere
d. centre and loaded anywhere

10. Internal forces at every cross-section in an arch are
a. normal thrust and shear force
b. shear force and bending moment
c. normal thrust and bending moment
d. normal thrust, shear force and bending moment

11. A three hinged arch is carrying uniformly distributed load over the entire span. The arch is free from shear force and bending moment if its shape is
a. circular
b. parabolic
c. elliptical
d. none of the above

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CIVIL ENGINEERING PAPER 1 JULY

12. A hollow shaft will transmit ..... power than a solid shaft of same weight and material
a. less
b. same
c. more
d. none of the above

13. If a circular shaft is subjected to a torque T and bending moment M, the ratio of maximum bending stress and maximum shear stress is
a. 2M/T
b. M/2T
c. M/T
d. 2T/M

14. A rectangular block of size 200 mm × 100 mm × 50 mm is subjected to a shear stress of 100 N/mm². If modulus of rigidity of material is 1×10^5 N/mm², strain energy stored will be
a. 10 N.m
b. 25 N.m
c. 50 N.m
d. 100 N.m

15. At a point in a steel member, the major principal stress is 2000 kg/cm² and the minor principal stress is compressive. If the uni-axial tensile yield stress is 2500 kg/cm², then the magnitude of the minor principal stress at which the yielding will commence according to the maximum shearing stress theory is,
a. 1000 kg/cm²
b. 2000 kg/cm²
c. 2500 kg/cm²
d. 500 kg/cm²

16. A bar AB, 4 cm in diameter and 4 m long is rigidly fixed at its ends. A torque of 12,000 kg cm is applied at a section of the bar, one metre from end A. The fixing couples T_A and T_B (in kg. cm) at the supports A and B will be respectively,
a. 9000, 6000
b. 3000, 9000
c. 6000, 9000
d. 9000, 3000

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17. A three hinged parabolic arch rib of span 'L' and crown rise 'h' carries a uniformly distributed superimposed load of intensity 'w' per unit length. The hinges are located on two abutments at the same level and the third hinge at a quarter span locations from left hand abutment. The horizontal thrust on the abutment is
a. $wL^2/4h$
b. $wL^2/6h$
c. $wL^2/8h$
d. $wL^2/12h$

18. Consider the following statements:
1. If a beam has two axis of symmetry, even then shear centre does not coincide with the centroid.
2. For a section having one axis of symmetry, the shear centre does not coincide with the centroid but lies on the axis of symmetry.
3. If a load passes through the shear centre, then there will be only bending in the cross section and no twisting
Of these statement
a. 1, 2 and 3 are correct
b. 1 and 2 are correct
c. 2 and 3 are correct
d. 1 and 3 are correct

19. Consider the following statements regarding a beam of uniform cross section simply supported at its ends and carrying a concentrated load at one of its third points:
1. Its deflection under the load will be maximum.
2. The bending moment under the load will be maximum.
3. The deflection at the mid-point of the span will be maximum.
4. The slope at the nearest support will be maximum.
Of these statements
a. 1 and 3 are correct
b. 2 and 4 are correct
c. 1 and 2 are correct
d. 3 and 4 are correct

20. Which of the following has highest crushing strength?
a. lime stone b. granite
c. gneiss d. laterite

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21. The number of standard bricks required for one cubic metre of brick masonry is
a. 400
b. 500
c. 750
d. 250

22. The process of adding water to lime to convert it into a hydrated lime is termed as
a. watering
b. baking
c. hydration
d. slaking

23. The ingredients added in the manufacturing process to control the setting time of cement is
a. magnesium sulphate
b. free lime
c. gypsum
d. calcium sulphate

24. The consistency test is performed to find
a. the correct water-cement ratio
b. the fineness of the cement
c. the compressive strength
d. tensile strength

25. The bulking of sand is due to
a. the increase in space between the particles caused by the surface tension effect of moisture.
b. the swelling of air in voids
c. the viscous effect of moisture
d. none of the above

26. Pointing is the process whereby
a. the masonry joints are filled up with mortar after raking out for small depth
b. the grooves are cut on a plastered surface to give a look of masonry
c. small circles looking like points are cut out at random on a plastered surface
d. none of the above

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27. The concrete mix used for general R.C.C work is
a. 1 : 2 : 4
b. 1 : 1 : 2
c. 1 : 4 : 8
d. 1 : 5 : 10

28. When the timber is attacked by fungus and reduced to powder, it is called
a. wet rot
b. dry rot
c. druxiness
d. doatiness

29. The main purpose of seasoning is
a. to make the timber fire resistant
b. to remove the moisture from the timber at uniform rate
d. to make the timber water proof
d. none of the above

30. The oil/liquid in which base and pigment are dissolved to form a paint is called
a. thinner
b. enamel paint
c. water paint
d. varnish

31. The defect in painting caused due to sliding of one layer of paint over another is known as
a. wrinkling
b. peeling
c. alligatoring
d. none of the above

32. Bloating of bricks is known a
a. bulking
b. bladdening
c. bloating
d. none of the above

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33. The plate loading test gives
a. the ultimate bearing capacity of the soil
b. safe bearing capacity of the soil
c. the depth of underlying rock
d. none of the above

34. In a static penetrometer test the angle of the penetrating cone is
a. 30˚
b. 45˚
c. 60˚
d. 75˚

35. A pile, which by itself does not carry any load but improves the bearing capacity of the soil is called
a. sheet pile
b. friction pile
c. bearing pile
d. compaction pile

36. The maximum permissible differential settlement in the case of foundation on sandy soils is generally about
a. 5 mm
b. 10 mm
c. 20 mm
d .25 mm

37. The maximum permissible eccentricity of load on a rectangular foundation with width B is equal to
a. B/3
b. B/6
c. B/2
d. b/4

38. A brick masonry could fail due to
a. rupture along a vertical joint in poorly bonded walls
b. shearing along a horizontal plane
c. crushing due to overloading
d. any of the above

MAGDALINE COACHING CENTRE (mc^2)
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39. The voussoir fixed at the crown of the arch is called
a. closer
b. springer
c. haunch
d. key

40. A group of tapering steps radiating from same point is known as
a. dancing steps
b. splayed steps
c. winders
d. fliers

41. The relationship between Young's modulus of elasticity E, bulk modulus K and Poisson's ratio μ is given by
a. $E = 2K(1 - 2\mu)$
b. $E = 3K(1 + \mu)$
c. $E = 3K(1 - 2\mu)$
d. $E = 2K(1 + \mu)$

42. The elongation of a conical bar under its own weight is equal to
a. that of a prismatic bar of same length
b. one half of a prismatic bar of same length
c. one third of a prismatic bar of same length
d. one fourth of a prismatic bar of same length

43. Effective length of a weld is equal to
a. overall length – weld size
b. overall length – throat thickness
c. overall length – 2 × weld size
d. overall length – 2 × throat thickness

44. Weakest section in a fillet weld is
a. throat of the fillet
b. smaller side
c. side parallel to force
d. side perpendicular to force

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CIVIL ENGINEERING PAPER 1 JULY

45. When a member is subjected to axial tension load, the greatest normal stress is equal to
a. half the maximum shear stress
b. maximum shear stress
c. twice the maximum shear stress
d. none of the above

46. Shear stress on principal plane sis
a. zero
b. maximum
c. minimum
d. none of the above

47. A simply supported beam of span l carries over its full span a load varying linearly from zero at either end to w/unit length at mid-span. The maximum bending moment occurs at
a. quarter points and is equal to $wl^2/8$
b. quarter points and is equal to $wl^2/12$
c. midspan and is equal to $wl^2/8$
d. midspan and is equal to $wl^2/12$

48. Of the several prismatic beams of equal lengths, the strongest in flexure is the one having maximum
a. moment of inertia
b. section modulus
c. tensile strength
d. area of cross-section

49. Maximum shear stress in a circular cross-section is
a. $\frac{9}{8}\, q_{av}$

b. $\frac{4}{3}\, q_{av}$

c. $\frac{3}{2}\, q_{av}$

d. $\frac{8}{3}\, q_{av}$

MAGDALINE COACHING CENTRE (mc²)
CIVIL ENGINEERING PAPER 1 JULY

50. Two beams, one of circular cross-section and other of square cross-section have equal areas of cross-section. If subjected to bending
a. circular section is more economical
b. square section is more economical
c. both sections are equally strong
d. both sections are equally stiff

51. Euler's formula for a mild steel long column hinged at both ends is not valid for slenderness ratio
a. greater than 80
b. less than 80
c. greater than 180
d. greater than 120

52. In a rectangular shaft subjected to torsion, the maximum shear stress occurs at
a. centre
b. corner
c. middle of smaller side
d. middle of longer side

53. Strain energy stored in a member is given by
a. 0.5 × stress × volume
b. 0.5 × strain × volume
c. 0.5 × stress × strain × volume
d. 0.5 × stress × strain

54. Impact test enables one to estimate the property of
a. hardness
b. toughness
c. strength
d. creep

55. Which one of the following statements about creep of metals is correct?
a. creep is deformation due to high temperature under no stress condition
b. creep is independent of temperature
c. creep is time dependent deformation under stress
d. for a given level of stress, the rate of creep is independent of time

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56. In terms of bulk modulus (K) and modulus of rigidity (C), the Poisson's ratio can be expressed as

a. $\frac{3K-4C}{6K+4C}$

b. $\frac{3K+4C}{6K-4C}$

c. $\mathbf{\frac{3K-2C}{6K+2C}}$

d. $\frac{3K+2C}{6K-2C}$

57. The shear centre of a section is defined as that point

a. through which load must be applied to produce zero twisting moment on the section

b. at which shear force is zero

c. at which the shear force is a maximum

d. at which the shear force is a minimum

58. The maximum shear stress from a Mohr's circle is given by

a. the diameter of the circle

b. the distance of centre from the origin

c. the distance of farthest point on the Mohr's circle from origin

d. the radius of the circle

59. When a column is resting on a base plate, the stresses along the surfaces of contact are

a. compressive stresses

b. shear stresses

c. tensile stresses

d. bearing stresses

60. Points of contra flexure are the points where

a. the S.F is zero

b. the B.M is zero

c. the beam is supported

d. the B.M changes its sign

61. The moment of inertia of triangular section b × h, about the base is

a. $bh^3/12$

b. $b^2h^2/2$

c. $bh^3/36$

d. $b^2h^2/36s$

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62. Which of the following timber is suitable for making sports goods?
a. Mulberry
b. Mahogany
c. Sal
d. Deodar

63. What is the maximum number of unknown reaction components that can be determined using only statics?
a. 0
b. 1
c. 2
d. 3

64. Polar moment of inertia of a hollow circular section with external diameter D and internal diameter d is
a. $\frac{\pi}{64}(D^4 - d^4)$
b. $\frac{\pi D}{32}(D^3 - d^3)$
c. $\frac{\pi D}{32}(D^4 - d^4)$
d. $\frac{\pi D^2}{32}(D^2 - d^2)$

65. The torsional formula is valid if the shearing stresses
a. are uniform throughout the cross-section
b. are within the shearing proportional limit
c. are zero throughout the cross-section
d. are caused due to twisting moment applied only at the free end

66. When a close coiled helical spring is subjected to an axial compressive load the material will be subjected to
a. axial compressive stress
b. axial tensile stress
c. shear stress
d. bending stress

67. If a fixed beam is subjected to u.d.I throughout the span, the point of contra-flexure will occur at
a. 1/2
b. at the two fixed supports
c. 0.21 l from each of the supports
d. 0.667 l from each of the supports

MAGDALINE COACHING CENTRE (mc^2)
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68. To avoid any possibility of tension occurring in masonry structures, the resultant of various forces at any level must pass through
a. the section
b. the centre of the section
c. middle third of the width or depth of the section
d. a corner of the section

69. The Euler crippling load for a column with both ends fixed is
a. $\pi^2 EI/l^2$
b. $4\pi^2 EI/l^2$
c. $\pi^2 EI/4l^2$
d. $2\pi^2 EI/l^2$

70. If the bending moment changes from positive to negative, the section where such change occurs is known as
a. point of inflation
b. crest point
c. point of contra flexure
d. neutral point

71. In which of the following case will the shear force as well as bending moment at the free end of a cantilever beam be equal to zero?
a. when it carries a concentrated load at mid span
b. when it carries a concentrated load at the end
c. when it carries a u.d.l. over the entire span
d. none of the above

72. What is the maximum shear stress induced in a thin spherical shell subjected to an internal fluid pressure p?
a. pD/2t
b. zero
c. pD/4t
d. pD/8t

73. The number of independent equations to be satisfied for static equilibrium of a plane structure is
a. 1
b. 2
c. 3
d. 6

74. Degree of kinematic indeterminacy of a pin-jointed plane frame is given by
a. 2j – r
b. j – 2r
c. 3j – r
d. 2j + r

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75. A pin-jointed plane frame is unstable if
a. (m + r) <2j
b. (m + r) =2j
c. (m + r) >2j
d. none of the above

76. The degree of static indeterminacy of a pin-jointed space frame is given by
a. m + r – 2j
b. m + r – 3j
c. 3m + r – 3j
d. m + r + 3j

77. The principle of virtual work can be applied to elastic system by considering the virtual work of
a. internal forces only
b. external forces only
c. internal as well as external forces
d. none of the above

78. 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

79. The moment required to rotate the near end of a prismatic beam through unit angle, without translation (the far end being fixed) is given by
a. EI/L
b. 2EI/L
c. 3EI/L
d. 4EI/L

80. If M is the external moment which rotates the near end of a prismatic beam without translation (the far end being fixed), then the moment induced at the far end is
a. M/2 in same direction as M
b. M/2 in opposite direction as M
c. M in opposite direction
d. 0

MAGDALINE COACHING CENTRE (mc^2)
CIVIL ENGINEERING PAPER 1 JULY

81. The maximum bending moment due to a train of wheel loads on a simply supported girder
a. always occurs at centre of span
b. always occurs under a wheel load
c. never occurs under a wheel load
d. none of the above

82. In the displacement method of structural analysis, the basic unknowns are
a. displacements
b. force
c. displacements and force
d. none of the above

83. In which of the following truss members the stress depends upon whether the load is moving on top chord or bottom chord.
a. top chord and bottom chord
b. verticals
c. diagonals
d. verticals and diagonals

84. The strain energy stored in a simply supported beam of span 'I' and flexural rigidity EI due to a central concentrated load W is
a. $W^2I^3/ 48 EI$
b. $W^2I^2/ 48 EI$
c. $W^2I^2/ 96 EI$
d. $W^2I^3/ 96 EI$

85. A cantilever is subjected to a concentrated load, W at the free end and is propped at the free end to the same level as that of the fixed support. The reaction in the prop will be
a. W/2
b. W
c. 2W
d. W/3

86. The shear force at a section in the conjugate beam corresponds to
a. shear force multiplied by *EI* at that section in real beam
b. deflection at that section multiplied by *EI* in real beam
c. *EI* times slope at that section in real beam
d. slope at that section in real beam.

MAGDALINE COACHING CENTRE (mc^2)
CIVIL ENGINEERING PAPER 1 JULY

87. In a pin-jointed plane frame all the loads are assumed to act
a. in the plane of the frame
b. perpendicular to the plane of the frame
c. in a plane inclined at 45° to the plane of the frame
d. none of the above

88. A pin jointed plane frame with j number of joints and n number of members will be internally redundant if,
a. $n > (2j - 3)$
b. $n < (2j - 3)$
c. $n = (2j - 3)$
d. $n > (2j + 3)$

89. The ratio of section moduli required for a fixed beam and a propped cantilever of same span with same material if both are subjected to u.d.I throughout the span is
a. 0.667
b. 1.5
c. 1.0
d. 2.5

90. A cylinder is to be designed as a thick cylinder when d/t ratio is
a. <20
b. >20
c. 10
d. negligible

91. When a single load W moves over a simply supported beam, the maximum b.m at a section will occur when the load is placed
a. over the nearer support
b. over the farther support
c. over the section
d. at centre of span

92. The ratio of stiffness of a member when far end is hinged to that of the member when far end is fixed is
a. 1
b. 2
c. 3/4
d. 4/3

MAGDALINE COACHING CENTRE (mc²)
CIVIL ENGINEERING PAPER 1 JULY

93. An arch can be treated as a curved beam
a. whose ends are restrained against horizontal movement
b. whose ends do not provide any reaction
c. whose ends are unsupported
d. none of the above

94. A three hinged arch will have three hinges
a. two at the two ends and one anywhere in between the two ends
b. two at the two ends and the third at the crown only
c. One hinge at the crown essentially and the other two anywhere
d. none of the above

95. The maximum strain energy stored in a material at elastic limit per unit volume is known as
a. resilience
b. proof resilience
c. modulus of resilience
d. modulus of rigidity

96. Slenderness ratio is defined as the ratio of the effective length of the column to the
a. least radius of gyration
b. least lateral dimension
c. radius of gyration about polar axis
d. none of the above

97. Workability of concrete is directly proportional to
a. aggregate cement ratio
b. time of transit
c. grading of the aggregate
d. all of the above

98. the most commonly used admixture which prolongs the setting and hardening time is
a. gypsum
b. calcium chloride
c. sodium silicate
d. all of the above

MAGDALINE COACHING CENTRE (mc^2)
CIVIL ENGINEERING PAPER 1 JULY

99. Modulus of rupture of concrete is a measure of
a. flexural tensile strength
b. direct tensile strength
c. compressive tensile strength
d. split tensile strength

100. Finer grinding of cement
a. affects only the early development of strength
b. affects only the ultimate strength
c. both (a) and (b)
d. does not affect the strength

101. Diagonal tension in a beam
a. is maximum at neutral axis
b. decreases below the neutral axis and increases above neutral axis
c. increases below the neutral axis and decrease above the neutral axis
d. remains same.

102. For walls, columns and vertical faces of all structural members, the form work is generally removed after
a. 24 to 48 hours
b. 3 days
c. 7 days
d. 14 days

103. Lap length in compression shall not be less than
a. 15 ϕ
b. 20 ϕ
c. 24 ϕ
d. 30 ϕ

104. According to IS: 456-1978, the maximum reinforcement in a column is
a. 2%
b. 4%
c. 6%
d. 8%

105. A continuous beam is deemed to be a deep bam when the ratio of effective span to overall depth (I/D) is less than
a. 1.5
b. 2.0
c. 2.5
d. 3.0

MAGDALINE COACHING CENTRE (mc²)
CIVIL ENGINEERING PAPER 1 JULY

106. In reinforced concrete footing on soil, the minimum thickness at edge should not be less than
a. 100 mm
b. 150 mm
c. 200 mm
d. 250 mm

107. The load carrying capacity of a helically reinforced column as compared to that of a tied column is about
a. 5% less
b. 10% less
c. 5% more
d. 10% more

108. In T-shaped R C retaining walls, the main reinforcement in the stem is provided on
a. the front face in one direction
b. the front face in both direction
c. the inner face in one direction
d. the inner face in both direction

109. To minimize the effect of differential settlement, the area of a footing should be designed for
a. dead load only
b. dead load + live load
c. dead load + fraction of live load
d. live load + fraction of dead load

110. The maximum compressive stress in concrete for design purposes is based on a partial safety factor of
a. 1.15
b. 1.50
c. 1.85
d. 2.20

111. The creep strains are
a. caused due to dead loads only
b. caused due to live loads only
c. caused due to both dead loads and live loads
d. independent of loads

MAGDALINE COACHING CENTRE (mc²)
CIVIL ENGINEERING PAPER 1 JULY

112. The purpose of reinforcement in pre-stressed concrete is
a. to provide adequate bond stress
b. to resist tensile stresses
c. to impart initial compressive stress in concrete
d. all of the above

113. Cube strength of controlled concrete to be used for pre-tensioned and post-tensioned work respectively should not be less than
a. 35 MPa and 42 MPa
b. 42 MPa and 35 MPa
c. 42 MPa and 53 MPa
d. 53 MPa and 42 MPa

114. The initial and final setting times for ordinary Portland cement are approximately related as
a. T = 530 + t
b. T = 270 + t
c. T = 90 + 1.2t
d. T = 600 – 1.2t

115. For reinforced concrete exposed to sulphate attack minimum grade required is
a. M 10
b. M 15
c. M 20
d. M 25

116. The purpose of lateral ties in short RC columns is to
a. avoid buckling of longitudinal bars
b. facilitate construction
c. facilitate compaction of concrete
d. increase the load carrying capacity of the columns

117. The side face reinforcement, if required, in a T-beam will be
a. 0.1% of the web area
b. 0.15% of the web area
c. 0.2% to 0.3% of the web area
d. half the longitudinal reinforcement

MAGDALINE COACHING CENTRE (mc²)
CIVIL ENGINEERING PAPER 1 JULY

118. A partially pre-stressed member is one in which
a. tensile stresses and cracking are permitted under service loads
b. no tensile stresses are permitted under service loads
c. mild steel is used in addition to pre stressing steel
d. tensile stresses are permitted but not cracking at service loads

119. Drops are provided in flat slab to resist
a. bending moment
b. thrust
c. shear
d. torsion

120. In an RCC beam, side face reinforcement is provided if its depth exceeds
a. 300 mm
b. 500 mm
c. 700 mm
d. 750 mm

121. In a RCC beam of breath b and overall depth D exceeding 750 mm, side face reinforcement required and the allowable area of maximum tension reinforcement shall be respectively
a. 0.2% and 0.02 bD
b. 0.3% and 0.03 bD
c. 0.1% and 0.04 bD
d. 0.4% and 0.01 bD

122. The tensile strength of concrete to be used in the design of reinforced concrete members is
a. 0.2 f_{ck}
b. 0.1 f_{ck}
c. 0.7 $\sqrt{f_{ck}}$
d. zero

123. By over-reinforcing the section in tension, the moment of resistance of beam can be increased by not more than
a. 10%
b. 15%
c. 18%
d. 25%

MAGDALINE COACHING CENTRE (mc²)
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124. The steel beam theory of doubly reinforced beams assumes that
a. tension is resisted by tension steel only
b. compression is resisted by compression steel only
c. stress in tension steel equals the stress in compression steel
d. all of the above

125. Thickened part of the flat slab over its supporting column is known as
a. column head
b. drop panel
c. capital
d. column strip

126. When bars of two different diameters are to be spliced, the lap length is calculated on the basis of
a. diameter of the larger bar
b. diameter of the smaller bar
c. men diameter of the bars
d. three-fourths diameter of the larger bars.

127. For the simply supported beams and slabs, the basic value of span to effective depth ratio is
a. 7
b. 10
c. 20
d. 26

128. The minimum percentage of longitudinal reinforcement in R.C.C columns is
a. 0.6
b. 0.8
c. 1.2
d. 4.0

129. The spacing of longitudinal reinforcement in columns measured along the perimeter of the section shall not be more than
a. 200 mm
b. 250 mm
c. 275 mm
d. 300 m

MAGDALINE COACHING CENTRE (mc²)
CIVIL ENGINEERING PAPER 1 JULY

130. The minimum percentage of main reinforcement in R.C.C walls when it is not carrying any load is
a. 0.4
b. 0.15
c. 0.1
d. no such limit

131. In a cantilever retaining wall of height "H", the horizontal pressure of earth will act at a distance of
a. H/3 from the top
b. H/3 from the base
c. H/2 from the top
d. H/4 from the base

132. The minimum thickness of stem at the top in a cantilever retaining wall should be
a. 100 mm
b. 150 mm
c. 200 mm
d. 300 mm

133. The minimum factor of safety against overturning for a retaining wall is
a. 3.0
b. 2.0
c. 1.5
d. 1.0

134. Pre-stressing in concrete beams is usually obtained by
a. external pre-stressing
b. chemical reaction
c. internal pre-stressing
d. steam curing

135. A tendon with two straight line segments and an intermediate kink introduces in a pre-stressed concrete beam
a. compression
b. bending and compression
c. compression, bending and shear
d. tension and shear

MAGDALINE COACHING CENTRE (mc^2)
CIVIL ENGINEERING PAPER 1 JULY

136. The decrease in stress caused in a pre-stressed beam at constant strain is called
a. creep loss
b. relaxation
c. shrinkage
d. transfer stress

137. In the limit state method, the maximum strain in concrete in bending compression is taken to be
a. 0.35
b. 0.035
c. 0.0035
d. 0.00035

138. The separation of water from a freshly mixed concrete is known as
a. separation
b. creping
c. bleeding
d. segregation

139. Los Angeles machine is used to test the aggregate for
a. impact value
b. abrasion resistance
c. water absorption
d. crushing strength

140. The modulus of elasticity of steel is generally taken as
a. 2×10^3 N/mm²
b. 2×10^4 N/mm²
c. 2×10^5 N/mm²
d. 2×10^2 N/mm²

141. Over reinforced section is not desirable because
a. heavy reinforcement makes it uneconomical
b. failure is sudden as concrete fails first
c. its design is highly complicated
d. none of the above

MAGDALINE COACHING CENTRE (mc^2)
CIVIL ENGINEERING PAPER 1 JULY

142. A combined footing is needed when
a. the columns are too near and their footings overlap
b. the bearing capacity of the soil is very less
c. the end column is near the property line
d. all the above

143. As per IS: 800, the maximum deflection in a beam should not exceed
a. L/180
b. L/250
c. L/325
d. L/360

144. If the thickness of thinnest outside plate is 10 mm, then the maximum pitch of rivets in tension will be taken as
a. 120 mm
b. 160 mm
c. 200 mm
d. 300 mm

145. Actual performance of a chart is called
a. An event
b. Activity
c. Duration
d. Anyone of these

146. According to IS specifications, the maximum pitch of rivets in compression is
a. lesser of 200 mm and 12 t
b. lesser of 200 mm and 16 t
c. lesser of 300 mm and 32 t
d. lesser of 300 mm and 24 t

147. Angle of inclination of the lacing bar with the longitudinal axis of the column should preferably be between
a.10˚ to 30˚
b. 30˚ to 40˚
c. 40˚ to 70˚
d. 90˚

MAGDALINE COACHING CENTRE (mc²)
CIVIL ENGINEERING PAPER 1 JULY

148. Shear buckling of web in a plate girder is prevented by using
a. vertical intermediate stiffener
b. horizontal stiffener at neutral axis
c. bearing stiffener
d. none of the above

149. The range of economical spacing of trussed varies from
a. L/3 to L/5
b. L/4 to 2L/5
c. L/3 to L/2
d. 2L/5 to 3L/5

150. As per IS: 800, the maximum bending moment for design of purlins can be taken as
a. WL/6
b. WL/8
c. WL/10
d. WL/12

151. The minimum thickness of plates in a steel stack should be
a. 4 mm
b. 5 mm
c. 6 mm
d. 8 mm

152. The shape factor for a solid circular section subjected to bending about its diameter is
a. 1.12
b. 1.5
c. 1.7
d. 2.00

153. The ratio of plastic section modulus to elastic section modulus
a. is equal to 1
b. is always less than 1
c. is always greater than 1
d. can be less than 1

MAGDALINE COACHING CENTRE (mc²)
CIVIL ENGINEERING PAPER 1 JULY

154. A steel beam supporting loads from the floor slab as well as from wall is termed as
a. stringer beam
b. lentel beam
c. spandrel beam
d. header beam

155. The angle of dispersion of a concentrated load on the flange to the web plate of a steel beam is
a. 90˚ with the horizontal
b. 60˚ with the vertical
c. 45˚ with the horizontal
d. 30˚ with the vertical

156. The weakest plane in the fillet weld is
a. a side parallel to the force
b. a side normal to the force
c. the side along the throat
d. the side normal to the throat

157. The thickness of web for unstiffened plate girder with clear distance d between the flanges shall not be less than
a. d/200
b. d/85
c. d/100
d. d/160

158. The nail diameter should not be more than (t= least thickness of the wooden member to be connected)
a. t/6
b. t/8
c. t/10
d. t/12

159. The maximum longitudinal pitch allowed in staggered riveted compression member is
a. 24t or 300 mm whichever is less
b. 18t or 300 mm whichever is less
c. 6 D or 300 mm whichever is more
d. 6t + 200 mm

160. The ratio of the permissible bearing stress of turned and fitted bolts to the yield stress of mild steel is
a.1.0
b. 0.9
c. 0.67

d. 0.87

161. The strength of a riveted joint is equal to
a. shearing strength of the rivets
b. bearing strength of the rivets
c. tearing strength of the plates
d. least of (a), (b) and (c)

162. Generally the size of a butt weld is indicated by the effective throat thickness, but in the case of incomplete penetration, it is taken as
a. half the thickness of the thicker part joined
b. three-fourths thickness of the thicker part joined
c. three-fourths thickness of the thinner part joined
d. seven-eighths thickness of the thinner part joined

163. The effective length of an intermittent fillet weld should be
a. 16 times the thickness of the thinner part connected
b. the perpendicular distance between the welds
c. twice the perpendicular distance between the welds
d. 4 times the size of weld or 40 mm whichever is greater

164. The minimum thickness of steel members exposed to weather and accessible for painting is
a. 10 mm
b. 8 mm
c. 6 mm
d. 4 mm

165. Effective length of a compression member effectively held in position at both ends but not restrained in direction is
a.0.67 L
b. 0.85 l
c. L
d.1.5 L

166. The most economical section for a column is
a. I-section
b. tubular section
c. solid round section
d. rectangular section

MAGDALINE COACHING CENTRE (mc^2)
CIVIL ENGINEERING PAPER 1 JULY

167. Battens in compound steel columns are provided mainly to
a. ensure unified behaviour
b. increase the column capacity
c. decrease the buckling in members
d. prevent buckling

168. Lacing bars and battens in compound steel columns are designed to resist a transverse shear force of
a.1.5% of the axial load
b.2.0% of the axial load
c.2.5% of the axial load
d.3.0% of the axial load

169. The minimum width of a lacing bar depends on
a. nominal diameter of rivets
b. thickness of lacing bar
c. length of the member
d. no relation at all

170. The permissible bending stresses in slab bases is (in kg/cm^2)
a. 1890
b. 1650
c. 1575
d. 1500

171. The maximum spacing of vertical stiffeners in a plate girder is limited to
a. 0.7 d
b. d
c. 1.5 d
d. 2d

172. Intermediate vertical stiffeners are provided if the thickness of the mild steel web is less than
a. d/85
b. d/100
c. d/180
d. d/200

173. Bearing stiffeners are provided in plate girders to
a. eliminate web buckling
b. transfer concentrated loads
c. prevent excessive buckling
d. eliminate local buckling

MAGDALINE COACHING CENTRE (mc^2)
CIVIL ENGINEERING PAPER 1 JULY

174. The member of a roof truss which is parallel to the span of the truss and primarily under tension is called as
a. principal rafter
b. principal tie
c. sag tie
d. main strut

175. The economic range of spacing of roof trusses is
a. 1/2 to 1/3 of span
b. 1/2 to 1/4 of span
c. 1/4 to 1/6 of span
d. 1/3 to 1/5 of span

176. A structural element used to support a vertical cladding is called
a. cleat
b. runner
c. ferrule
d. diaphragm

177. The plastic hinge in a section is caused
a. when the material at a section reach plastic state
b. when the extreme fibres at a section reach the yield state
c. when all the fibres at a section reach the yield state
d. none of the above

178. A column splice is used to increase
a. the length of the column
b. the strength of the column
c. the rigidity of the column
d. the cross-sectional area of the column

179. When the depth of plate girder is less than 750 mm, it is called
a. deep plate girder
b. shallow plate girder
c. economical plate girder
d. box girder

180. A rectangular beam has a width b and depth d. Its plastic modulus is
a. $bd^2/12$
b. $bd^2/8$
c. $bd^2/6$
d. $bd^2/4$

MAGDALINE COACHING CENTRE (mc^2)
CIVIL ENGINEERING PAPER 1 JULY

181. A structural member subjected to tensile force in a direction parallel to its longitudinal axis is called
a. tension member
b. tie member
c. tie
d. any one of these

182. The inclination of lacing bars with the longitudinal axis of the component member is usually between
a. 40˚ to 70˚
b. 30˚ to 40˚
c. 20˚ to 30˚
d. 10˚ to 20˚

183. In PERT analysis, the time estimates of activities and probability of their occurrence follow
a. normal distribution curve
b. Poisson's distribution curve
c. β- distribution curve
d. binomial distribution curve

184. Free float is mainly used to
a. identify the activities which can be delayed without affecting the total float of preceding activity
b. identify the activities which can be delayed without affecting the total float of succeeding activity
c. establish priorities
d. identify the activities which can be delayed without affecting the total float of either the preceding or succeeding activities

185. Slack time in PERT analysis
a. can never be greater than zero
b. is always zero for critical activities
c. can never be less than zero
d. is minimum for critical events

186. Which of the following excavators is most suitable for digging under water?
a. drag line
b. hoe
c. clam shell
d. dipper shovel

MAGDALINE COACHING CENTRE (mc²)
CIVIL ENGINEERING PAPER 1 JULY

187. Sinking fund is
a. the fund for rebuilding a structure when its economic life is over
b. raised to meet maintenance costs
c. the total sum to be paid to the municipal authorities by the tenants
d. a part of the money kept for reserve.

188. In resource levelling
a. total duration of project is reduced
b. total duration of project is increased
c. uniform demand of resources is achieved
d. cost of project is controlled

189. The most suitable type of equipment for compaction of cohesive soils is
a. smooth-wheeled rollers
b. vibratory rollers
c. sheep foot rollers
d. tampers

190. A drawback of the bar chart is that
a. it is difficult to judge whether an activity is completed or not
b. all the activities represented are independent of each other
c. sequence of activities is not clearly defined
d. it is not possible to judge whether the activity is ahead or behind schedule

191. Which of the following is an example of parallel activities?
a. construction of walls and casting of roof
b. construction of walls and carpentry work of doors and windows
c. casting of roof and construction of parapet wall
d. digging of well and construction of septic tank

192. A dummy activity
a. has no tail event but only a head event
b. has only head event but no tail event
c. does not require any resources or any time
d. has no bearing on the network and can appear anywhere

193. In PERT, the critical path represents the
a. shortest path for the earliest completion of the project
b. longest path of the network from the initial to final event
c. ideal path by proceeding along which the project can be completed as per schedule
d. path which takes into account the completion of the parallel activities

MAGDALINE COACHING CENTRE (mc^2)
CIVIL ENGINEERING PAPER 1 JULY

194. The optimistic, most likely and pessimistic time estimates of an activity are 5, 10, 21 days. What are the expected time and standard deviation?
a. 12, 3
b. 11, 4
c. 11, 2.67
d. 10, 16

195. Crashing the project means
a. reducing the time of completion by spending more resources
b. reducing the cost of project by delaying the time of completion
c. reducing the project size to save the resources
d. all the above

196. The quantity of damp proof course (D.P.C) is worked out in
a. m^3
b. m^2
c. m
d. lump-sum

197. In the analysis of rates, the profit for the contractor is generally taken as
a. 20%
b. 15%
c.10%
d. 5%

198. The value of the dismantled materials less the cost of dismantling is called
a. the scrap value
b. salvation value
c. rateable value
d. none of the above

199. In what units are the quantities for the frame of doors and windows computed
a. m
b. m^2
c. m^3
d. lump-sum

200. The head of the division of public works department is
a. chief engineer
b. superintending engineer
c. executive engineer
d. divisional engineer