81. If the two exactly same pumps are running at the same speed and lift the water at the head of 20 m and 30 m respectively. What is the diameter of impeller of second pump if the diameter (mm) of imperller of first pump is 500 mm?

OP 1 : 430.2
OP 2 : 500.5
OP 3 : 612.5
OP 4 : 714.3

82. Which of the following is a non-recording raingauge?

OP 1 : Symon's raingauge
OP 2 : Weighing type raingauge
OP 3 : Floating type raingauge
OP 4 : None of these

83. Calculate the evaporation (mm) from a pond, if the pan evaporation is 45 mm, the pan coefficient is 0.70

OP 1 : 13.5
OP 2 : 19.28
OP 3 : 31.5
OP 4 : 64.28

84. The intensity of the rainfall for successive. 1 hours period of a 6 hours strom are 2,6,8,9,7 and 3 cm/hr. Calculate the φφ-index (cm./hr).

OP 1 : 2.5
OP 2 : 3.5
OP 3 : 4.6
OP 4 : 7.67

85. Calculate the runoff (cm) from a rainfall of 3 hours.The intensity of the rainfall is 2 cm/hr. The evaporation and infiltration losses are 8 mm and 16 mm

OP 1 : 1.2
OP 2 : 2.8
OP 3 : 3.6
OP 4 : 6.8

86. What is the rainfall intensity (mm/hr) according to the formula given by British Ministry of Health, if the time of concentration is 540 second?

OP 1 : 20
OP 2 : 30
OP 3 : 40
OP 4 : 50

87. The discharge capacity required at the outlet to irrigate at the outlet to irrigate 2600 ha of sugarcane having a kor depth of 17 cm and a kor period of 30 days is

OP 1 : 2.3m³/s
OP 2 : 1.71 m³/s
OP 3 : 14.7 m³/s
OP 4 : 0.18 m³/s

88. Intensity of irrigation_____.

OP 1 : Is the percentage of culturable commanded area propsed to be irrigated annually
OP 2 : Is always more than 100%
OP 3 : Is the percentage that could be ideally irrigated
OP 4 : All the option are correct

89. The field irrigation requirement is computed as ___.

OP 1 : Consumptive use+field application losses
OP 2 : Net irrigation requirement + field application losses
OP 3 : Net irrigation requirement + conveyance losses
OP 4 : Consumptive use + conveyance losses

90. The field capacity of a soil is 25%, its permanent wilting point is 15% and specific dry unit weight is 1.5. If the depth of root zone of crop is 80 cm, the storage capacity of the soil is

OP 1 : 8 cm
OP 2 : 10 cm
OP 3 : 12 cm
OP 4 : 14 cm

91. If the irrigation efficiency is 80% conveyance losses are 20% and the actual depth of watering is 16 cm, the depth of water required at the canal outlet is

OP 1 : 10 cm
OP 2 : 15 cm
OP 3 : 20 cm
OP 4 : 25 cm

92. A field of 500 hectares is to be irrigated for a particular crop having 100 days base period. The total depth of water required by the crop is 100 cm. Calculate the duty of the water (in hectares per cubic meter).

OP 1 : 8.64
OP 2 : 57.87
OP 3 : 86.4
OP 4 : 864

93. In an irrigated field, the net irrigation requirement is 15 cm, the application efficiency is 80% and water conveyance efficiency is 60%.What is the gross irrigation requirement (in cm)?

OP 1 : 11.25
OP 2 : 18.75
OP 3 : 25
OP 4 : 31.25

94. A beam simply-supported at both the ends , of length *l* carries two equal unlike couples M at two ends. If the flexural rigidity EI = constant, then the central defection of beam is given by

a. $M l^2 / 4 EI$
b. $M l^2 / 16 EI$
c. $M l^2 / 64 EI$
d. $M l^2 / 8 EI$

95. Partial safety factor for concrete and steel are 1.5 and 1.15 respectively, because

(a) Concrete is heterogeneous while steel is homogeneous
(b) The control on the quality of concrete is not as good as that of steel
(c) Concrete is weak in tension
(d) Voids in concrete are 0.5% while those in steel are 0.15%

96. In case of single angles in tension connected by one leg only, the net effective area as per IS : 800 is
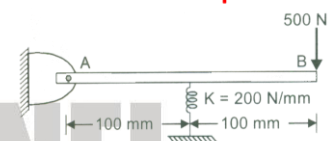
a. Gross area-area of holes

b. $a + \dfrac{b}{1+0.33(b/a)}$

c. $a + \dfrac{b}{1+0.2(b/a)}$

d. $a + \dfrac{b}{1+0.35(a/b)}$

97. A rigid bar AB supported by a spring as shown in the figure above. What is the deflection of the point 'b'

a. 25 mm
b. 20 mm
c. 15 mm
d. 10 mm

98. Consider the following statements: The design for the limit state of collapse in flexure is based on the following assumptions:

1. Plane sections normal to the axis remain plane after bending.
2. The maximum strain in concrete at the outermost tension fibre is 0.0035.
3. The relationship between the compressive stress distribution in concrete and the strain in concrete may be assumed to be rectangular, trapezoidal, parabolic or any other shape which results in prediction of strength in substantial agreement with the results of tests

Select the correct answer using the codes given below:
(a) 1 and 3
(b) 1, 2 and 3
(c) 2 and 3
(d) 1 and 2

99. 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

Where t is thickness of thinnest outside plate or angle

100. A rectangular beam of width 100 mm is subjected to a maximum shear force of 60 kN. The corresponding maximum shear stress in the cross section is 4 N/mm² . The depth of the beam should be

A. 150 mm   B. 225 mm
C. 200 mm   D. 100 mm

101. What is the value of flexural strength of M 25 concrete?

(a) 4.0 MPa
(b) 3.5 MPa
(c) 3.0 MPa
(d) 1.75 MPa

102. According to IS specifications, the effective length of a column effectively held in position at both ends and restrained in direction at one end is taken as

a. 0.67 L
b. 0.8 L
c. L
d. 1.5 L

102. In the symmetrical channel section shown in the figure. Which point is likely to be shear centre ?
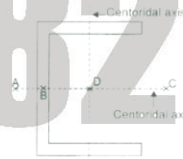
104. The maximum strain in the tension reinforcement in the section at failure when designed for the limit state of collapse should be

A. $> \left(\frac{f_y}{1.15E_s} + 0.002 \right)$

B. $< \left(\frac{f_y}{1.15E_s} + 0.002 \right)$

C. Exactly equal to $\left(\frac{f_y}{1.15E_s} + 0.002 \right)$

D. < 0.002

105. Consider the following statements :

In a simply supported beam subjected to uniformly distributed load throughout the length, at which points is the stress due to
(i) flexure and (ii) shear equal to zero selectively
1. At support section at neutral fibre.
2. At mid span section at neutral fibre.
3. At mid span section at top fibre.
4. At support section at bottom fibre.

Which of the above statements is/are correct ?
a. 1 only
b. 1 and 2
c. 2 and 3
d. 2 and 4

106. Match List-I with List-II and select the correct answer using the code given below the lists:

| List-I	List-II
A. IS-875	1. Earthquake resistant design
B. IS-1343	2. Loads
C. IS-1893	3. Liquid storage structure
D. IS-3370	4. Prestressed concrete

Codes:
a. A – 3, B – 1, C – 4, D – 2
b. A – 2, B – 1, C – 4, D – 3
c. A – 3, B – 4, C – 1, D – 2
d. A – 2, B – 4, C – 1, D – 3

107. If the 20 mm rivets are used in lacing bars, then the minimum width of lacing bar should be

a. 40 mm
b. 60 mm
c. 80 mm
d. 100 mm

108. A rigid bar AC is supported by three rods of same material and of equal diameter. The bar AC is initially horizontal. A force P is applied such that the bar AC continues to remain horizontal. Forces in each of the shorter bars and in the longer bar are, respectively
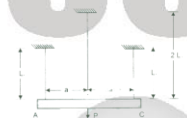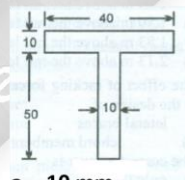

a. 0.4 P, 0.2 P
b. 0.3 P, 0.4 P
c. 0.2 P, 0.6 P
d. 0.5 P, zero

109. The additional cover thickness to be provided in reinforced concrete members that are totally immersed in seawater is

(a) 25 mm
(b) 30 mm
(c) 35 mm
(d) 40 mm

110. In the T-section shown in fig. (all dimensions in mm), the distance of plastic neutral axis from top is

a. 10 mm
b. 15 mm
c. 20 mm
d. 30 mm

111. A brass bar of solid section is encased in a steel tube shown in figure, the coefficient of expansion of steel is 11.2 x 10⁻⁶ per ˚C and the coefficient of expansion of brass is 16.5 x 10⁻⁶ per ˚C . The composite bar is heated through 60˚ C. now consider the following statements:

1. The stress in the brass will be tensile
2. The stress in the steel will be tensile
3. The stress in the steel will be compressive
4. The stress in the brass will be compressive
Which of the statement given above are correct ?
a. 1 and 2
b. 1 and 3
c. 2 and 4
d. 2 and 3

112. For a reinforced concrete beam section the shape of the shear stress diagram is

(a) Parabolic over the whole section with 58. maximum value at the neutral axis
(b) Parabolic above the neutral axis and rectangular below the neutral axis
(c) Linearly varying as the distance from the neutral axis
(d) Dependent on the magnitude of shear reinforcement provided

113. The plastic section modulus for a rectangular section of width b and depth d is
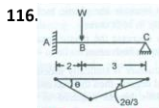
a. $\dfrac{bd^2}{3}$ b. $\dfrac{bd^2}{4}$

c. $\dfrac{bd^2}{6}$ d. $\dfrac{bd^2}{12}$

114. If the Young's modulus 'E' is equal to bulk modulus 'K' then what is the value of the poisson's ratio ?

a. 1 / 4
b. 1 / 2
c. 1 / 3
d. 3 / 4

115. As the span of a bridge increases, the impact factor

(a) decreases
(b) increases
(c) remains constant
(d) increases upto a critical value of span and then decrease

116.

If a uniform beam shown in fig. has the plastic moment capacity M for span AB and 0.9 M for span BC, the correct virtual work equation is given by

a. $M_p.\theta + M_p\left(\theta + \frac{2\theta}{3}\right) = w.2\theta$

b. $M_p.\theta + M_p.\theta + 0.9M_p\frac{2\theta}{3} = w.2\theta$

c. $M_p.\theta + 0.9M_p\left(\theta + \frac{2\theta}{3}\right) = w.2\theta$

d. $M_p.\theta + 0.9M_p\left(\theta + \frac{2\theta}{3} + \frac{2\theta}{3}\right) = w.2\theta$

117. A steel rod, 100 mm long is held between two rigid supports. It is heated by 20°C. if the coefficient of thermal expansion of the material of the rod is 15 x 10⁻⁶ /°C and modulus of elasticity is 200 x 10³ mm² , what is the stress in the rod ?

1. 20 MN/m²
2. 40 MN/m²
3. 60 MN/m²
4. 80 MN/m²

118. Drop panel is a structural component in

(a) Grid floor
(b) Flat plate
(c) Flat slab
(d) Slab-beam system of floor

119. The minimum thickness of a steel plate, which is directly exposed to weather and is not accessible foe cleaning and repainting should be :

a. 4 . 5 mm
b. 6 mm
c. 8 mm
d. 10 mm

120. Consider the following statements in respect of design of web and flange splices.

i. Flange splice shall be designed for actual BM at the section
ii. Flange splice shall be designed to resist the actual shear at the section
iii. Web splice shall be designed to resist the actual BM at the section
iv. Web splice shall be designed for actual BM

Of these statements
a. (i) and (iii) are correct
b. (i) and (iv) are correct
c. (ii) and (iv) are correct
d. (i) (iii)and (iv) are correct