500 MCQs of Civil Engineering

Civil Engineering by Sandeep Jyani Sir
The shape of stress strain curve for concrete as prescribed by IS 456 is
a) Rectangular  
b) Parabolic  
c) Rectangular Parabolic  
d) None of these
The shape of stress strain curve for concrete as prescribed by IS 456 is

a) Rectangular

b) Parabolic

c) Rectangular Parabolic

d) None of these
An RCC beam can have maximum tension reinforcement as:

a) 6 % bD  
b) 2 % bD  
c) 3 % bD  
d) 4 % bD
An RCC beam can have maximum tension reinforcement as:

a) 6 % bD
b) 2 % bD
c) 3 % bD
d) **4 % bD**
The maximum depth of neutral axis for a beam with Fe 415 bars in limit state method of design

a) 0.46 d
b) 0.48 d
c) 0.50 d
d) 0.53 d
The maximum depth of neutral axis for a beam with Fe 415 bars in limit state method of design

a) 0.46 d
b) 0.48 d

c) 0.50 d
d) 0.53 d

<table>
<thead>
<tr>
<th>$f_y$ N/mm$^2$</th>
<th>$X_{ulim}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fe 250</td>
<td>0.53 d</td>
</tr>
<tr>
<td>Fe 415</td>
<td>0.48 d</td>
</tr>
<tr>
<td>Fe 500</td>
<td>0.46 d</td>
</tr>
</tbody>
</table>
The partial factor of safety for concrete is

a) 1.15
b) 1.5
c) 1.95
d) 2.0
The partial factor of safety for concrete is

a) 1.15
b) 1.5

c) 1.95
d) 2.0
Partial factor of safety for concrete and steel respectively may be taken as
a) 1.5 and 1.15
b) 1.5 and 1.78
c) 3 and 1.78
d) 3 and 1.2
Partial factor of safety for concrete and steel respectively may be taken as

a) 1.5 and 1.15
b) 1.5 and 1.78
c) 3 and 1.78
d) 3 and 1.2
206. The characteristic strength of concrete in the actual structure is taken as

\[ \text{a) } f_{ck} \]
\[ \text{b) } 0.85 \, f_{ck} \]
\[ \text{c) } 0.67 \, f_{ck} \]
\[ \text{d) } 0.447 \, f_{ck} \]
206. The characteristic strength of concrete in the actual structure is taken as

a) $f_{ck}$
b) $0.85 \, f_{ck}$
c) $0.67 \, f_{ck}$
d) $0.447 \, f_{ck}$
Que 207. In limit state of collapse against flexure, the maximum strain in tension reinforcement at failure shall not be less than

(a) 0.002

(b) 0.002 + \( \frac{f_y}{E_s} \)

(c) 0.002 + \( \frac{f_y}{0.87E_s} \)

(d) 0.002 + \( \frac{f_y}{1.15E_s} \)
Que 207. In limit state of collapse against flexure, the maximum strain in tension reinforcement at failure shall not be less than

(a) $0.002$

(b) $0.002 + \frac{f_y}{E_s}$

(c) $0.002 + \frac{f_y}{0.87 E_s}$

(d) $0.002 + \frac{f_y}{1.15 E_s}$
Que 208. The characteristic strength of concrete is defined as that compressive strength below which NOT more than

(a)2% of results fall
(b)10% of results fall
(c)5% of results fall
(d)None of these
Que 208. The characteristic strength of concrete is defined as that compressive strength below which NOT more than

(a) 2% of results fall
(b) 10% of results fall
(c) 5% of results fall
(d) None of these
Que 207. The modulus of elasticity of concrete (in N/mm²) can be assumed as follows where $f_{ck}$ is the characteristic cube compressive strength of concrete (in N/mm²)

(a) $4000 \sqrt{f_{ck}}$
(b) $5000 \sqrt{f_{ck}}$
(c) $2000 \sqrt{f_{ck}}$
(d) $3000 \sqrt{f_{ck}}$
Que 207. The modulus of elasticity of concrete (in N/mm$^2$) can be assumed as follows where $f_{ck}$ is the characteristic cube compressive strength of concrete (in N/mm$^2$)

(a) $4000 \sqrt{f_{ck}}$
(b) $5000 \sqrt{f_{ck}}$
(c) $2000 \sqrt{f_{ck}}$
(d) $3000 \sqrt{f_{ck}}$
Que 208. The factored loads at the limit state of collapse for DL + LL, DL + WL and DL + LL + WL combinations, according to IS : 456 – 2000 are respectively

(a) 1.2 DL + 1.2 LL, 1.5 DL + 1.5 WL, 1.5 DL + 1.5 LL + 1.5 WL
(b) 1.2 DL + 1.5 LL, (0.9 or 1.5) DL + 1.5 WL, 1.2 DL + 1.2 LL + 1.2 WL
(c) 1.5 DL + 1.5 LL, 1.2 DL + 1.2 WL, 1.5 DL + 1.5 LL + 1.5 WL
(d) (0.9 or 1.5) DL + 1.5 LL, 1.5 DL + 1.5 WL, 1.2 DL + 1.2 LL + 1.2 WL
Que 208. The factored loads at the limit state of collapse for DL + LL, DL + WL and DL + LL + WL combinations, according to IS : 456 – 2000 are respectively

(a) 1.2 DL + 1.2 LL, 1.5 DL + 1.5 WL, 1.5 DL + 1.5 LL + 1.5 WL

(b) 1.2 DL + 1.5 LL, (0.9 or 1.5) DL + 1.5 WL, 1.2 DL + 1.2 LL + 1.2 WL

(c) 1.5 DL + 1.5 LL, 1.2 DL + 1.2 WL, 1.5 DL + 1.5 LL + 1.5 WL

(d) (0.9 or 1.5) DL + 1.5 LL, 1.5 DL + 1.5 WL, 1.2 DL + 1.2 LL + 1.2 WL
Que 209. In limit state of collapse for direct compression, the maximum axial compressive strain in concrete is

(a) 0.002
(b) 0.003
(c) 0.0035
(d) 0.004
Que 209. In limit state of collapse for direct compression, the maximum axial **compressive** strain in concrete is

(a) 0.002 compression
(b) 0.003
(c) 0.0035 (axial compression and bending)
(d) 0.004
210. As per IS 456–2000, in the absence of test data, the approximate value of the total shrinkage strain for design may be taken as:

(a) 0.004
(b) 0.001
(c) 0.002
(d) 0.0003
210. As per IS 456–2000, in the absence of test data, the approximate value of the total shrinkage strain for design may be taken as:

(a) 0.004
(b) 0.001
(c) 0.002
(d) 0.0003

6.2.4.1 In the absence of test data, the approximate value of the total shrinkage strain for design may be taken as 0.0003 (for more information, see IS 1343).
211. Mid steel used in RRC structures conforms to

(a) IS : 432
(b) IS : 1566
(c) IS : 1786
(d) IS : 2062
211. Mid steel used in RRC structures conforms to

(a) IS : 432
(b) IS : 1566
(c) IS : 1786
(d) IS : 2062
212. percentage of steel for balanced design of a singly reinforced rectangular section by limit state method depends on

A. Characteristic strength of concrete
B. Yield strength of steel
C. Modulus of elasticity of steel
D. Geometry of the section

(a) Only (B)
(b) (A), (B) and (D)
(c) (B), (C) and (D)
(d) (A), (B) and (C)
212. percentage of steel for balanced design of a singly reinforced rectangular section by limit state method depends on

A. Characteristic strength of concrete

B. Yield strength of steel

C. Modulus of elasticity of steel

D. Geometry of the section

(a) Only (B)

(b) (A), (B) and (D)

(c) (B), (C) and (D)

(d) (A), (B) and (C)
213. partial safety 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%
213. partial safety for concrete and steel are 1.5 and 1.15 respectively, because

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214. 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) 0
214. 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) $0$
215. The allowable tensile stress in high yield strength deformed steel stirrups used in reinforced cement concrete is \( \text{(in } N/mm^2) \)

(a) 140
(b) 190
(c) 230
(d) 260
215. The allowable tensile stress in high yield strength deformed steel stirrups used in reinforced cement concrete is (in N/mm$^2$)

\[ \text{IS } 456 : 2000 \]

(a) 140  
(b) 190  
(c) 230  
(d) 260

Table 22 Permissible Stresses in Steel Reinforcement

(Clause B-2.2, B-2.2.1, B-2.3 and B-4.2)

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Type of Stress in Steel Reinforcement</th>
<th>Permissible Stresses in N/mm$^2$</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mild Steel Bars Conforming to Grade 1 of IS 432 (Part 1)</td>
<td>Medium Tensile Steel Conforming to IS 432 (Part 1)</td>
<td>High Yield Strength Deformed Bars Conforming to IS 1786 (Grade Fe 415)</td>
</tr>
<tr>
<td></td>
<td>Tension ($\sigma_t$ or $\sigma_{tu}$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Up to and including 20 mm</td>
<td>Half the guaranteed yield stress subject to a maximum of 190</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) Over 20 mm</td>
<td></td>
<td>230</td>
</tr>
<tr>
<td></td>
<td>Compression in column bars ($\sigma_c$)</td>
<td>130</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>Compression in a beam or slab when the compressive resistance of the concrete is taken into account</td>
<td>The calculated compressive stress in the surrounding concrete multiplied by 1.5 times the modular ratio or $\sigma_c$ whichever is lower</td>
<td></td>
</tr>
</tbody>
</table>
216. Factor of safety is the ratio of 
________.
(a) Yield stress to working stress.
(b) Tensile stress to working stress.
(c) Compressive stress to working stress.
(d) Bearing stress to working stress
216. Factor of safety is the ratio of _______.
(a) Yield stress to working stress.
(b) Tensile stress to working stress.
(c) Compressive stress to working stress.
(d) Bearing stress to working stress
217. The factor of safety for steel as compared to concrete is

(a) higher  
(b) same  
(c) lower  
(d) None of these
217. The factor of safety for steel as compared to concrete is

(a) higher
(b) same
(c) lower
(d) None of these
218. pick up the correct statement from the following______.
(a) Dead load includes self-weight of the structure and super-imposed loads permanently attached to the structure
(b) Dead loads change their positions and vary in magnitude
(c) Dead loads are known in the beginning of the design
(d) None of these
218. pick up the correct statement from the following_____.

(a) Dead load includes self-weight of the structure and super-imposed loads permanently attached to the structure
(b) Dead loads change their positions and vary in magnitude
(c) Dead loads are known in the beginning of the design
(d) None of these
219. In a single reinforced beam, if the permissible stress in concrete reaches earlier than that in steel, the beam section is called

(a) Underreinforced section
(b) Over reinforced section
(c) Economic section
(d) Critical section
219. In a single reinforced beam, if the permissible stress in concrete reaches earlier than that in steel, the beam section is called

(a) Underreinforced section
(b) **Over reinforced section**
(c) Economic section
(d) Critical section
220. Flexure strength of concrete is determined as:
(a) Modulus of rigidity
(b) Modulus of rupture
(c) Modulus of plasticity
(d) Modulus of elasticity
220. Flexure strength of concrete is determined as:

(a) Modulus of rigidity
(b) Modulus of rupture
(c) Modulus of plasticity
(d) Modulus of elasticity
221. Live loads with time, can vary in:

(a) Magnitude
(b) Position
(c) Neither position nor magnitude
(d) Position as well as magnitude
221. Live loads with time, can vary in:

(a) Magnitude
(b) Position
(c) Neither position nor magnitude
(d) Position as well as magnitude
222. The maximum shear stress \( (q) \) in concrete of a reinforced cement concrete beam is

(a) Shear force / (Lever arm \( \times \) Width)
(b) Lever arm / (Shear force \( \times \) Width)
(c) Width / (Lever arm \( \times \) shear force)
(d) None of these
222. The maximum shear stress \( (q) \) in concrete of a reinforced cement concrete beam is

(a) Shear force / (Lever arm × Width)
(b) Lever arm / (Shear force × Width)
(c) Width / (Lever arm × shear force)
(d) None of these

\[ \tau = \frac{V}{B \cdot j \cdot d} \]
223. The shear capacity of an RCC beam without shear reinforcement is

(a) $\tau_c \cdot bd$
(b) $\tau_v \cdot bd$
(c) $\tau_v \cdot bd^2$
(d) $\tau_v \cdot bd^2$
223. the shear capacity of an RCC beam without shear reinforcement is

\[(a)\tau_c \cdot bd\]
\[(b)\tau_v \cdot bd\]
\[(c)\tau_v \cdot bd^2\]
\[(d)\tau_v \cdot bd^2\]
224. Shear reinforcement is provided in the form of:

(a) Vertical bars
(b) Inclined bars
(c) Combination of vertical and inclined bars
(d) Any one of the above
224. Shear reinforcement is provided in the form of:

(a) Vertical bars
(b) Inclined bars
(c) Combination of vertical and inclined bars
(d) Any one of the above
225. The minimum percentage of shear reinforcement in R.C.C beams is

(a) \(0.85/f_y\)
(b) 0.4
(c) 4
(d) \(\frac{40S_v}{0.87 f_y d}\)
225. The minimum percentage of shear reinforcement in R.C.C beams is

(a) \(0.85/f_y\)
(b) 0.4
(c) 4
(d) \(\frac{40S_v}{0.87 f_y d}\)

\[
\frac{A_{sv}}{b s_v} \geq \frac{0.4}{0.87 f_y}
\]
226. Pick up the correct statement from the following:
(a) The bent up bars at a support resist the negative bending moment.
(b) The bent up bars at a support resist the shearing force.
(c) The bending of bars near supports is generally at 45 degree.
(d) All options are correct
226. Pick up the correct statement from the following:

(a) The bent up bars at a support resist the negative bending moment.
(b) The bent up bars at a support resist the shearing force.
(c) The bending of bars near supports is generally at 45 degree.
(d) All options are correct
227. Spacing of stirrups in a rectangular beam, is
(a) Kept constant throughout the length
(b) Decreased towards the center of the beam
(c) Increased at the ends
(d) Increased at the center of the beam
227. Spacing of stirrups in a rectangular beam, is
(a) Kept constant throughout the length
(b) Decreased towards the center of the beam
(c) Increased at the ends
(d) Increased at the center of the beam
228. The bond strength between steel and concrete is due to

(a) Friction
(b) Adhesion
(c) Both friction and adhesion
(d) None of these
228. The bond strength between steel and concrete is due to
(a) Friction
(b) Adhesion
(c) Both friction and adhesion
(d) None of these
229. The limit of percentage of longitudinal reinforcement in a column is given by

a) 0.15 - 2%
b) 0.8 - 4%
c) 0.8 - 6%
d) 0.8 – 8%
229. The limit of percentage of longitudinal reinforcement in a column is given by

a) 0.15 - 2%
   1. Minimum percentage of steel = 0.8%

b) 0.8 - 4%
   2. Maximum percentage of steel
      a) 4% if bar are lapped
      b) 6% if bars are not lapped

   c) 0.8 - 6%
      3. Minimum diameter of longitudinal bars = 12mm

   d) 0.8 – 8%
      4. Minimum number of bars
         a) For circular = 6
         b) For Rectangular = 4

      5. Maximum spacing of longitudinal bars = 300mm
230. The minimum number of main reinforcement bars provided in RC circular column

a) 2
b) 3
c) 4
d) 6
230. The minimum number of main reinforcement bars provided in RC circular column

a) 2
b) 3
c) 4
d) 6

...
231. The pitch of lateral ties should not exceed
a) The least lateral dimension
b) 16 times the diameter of longitudinal bars
c) 300mm
d) All of these
231. The pitch of lateral ties should not exceed

a) The least lateral dimension

b) 16 times the diameter of longitudinal bars

c) 300mm

d) All of these
232. The minimum number of longitudinal bars provided in rectangular RCC column

a) 2
b) 4
c) 6
d) 8
232. The minimum number of longitudinal bars provided in rectangular RCC column

a) 2
b) 4
c) 6
d) 8
233. The diameter of transverse reinforcement of columns should be equal to one fourth of the diameter of the main steel rods but not less than

a) 4mm
b) 5mm
c) 6mm
d) 7mm
233. The diameter of transverse reinforcement of columns should be equal to one fourth of the diameter of the main steel rods but not less than

a) 4mm
b) 5mm
c) 6mm
d) 7mm

7. Pitch and diameter of lateral ties
   A. The pitch of transverse reinforcement shall not more than the least of the following distances:
      a) The least lateral dimension of the compression members;
      b) Sixteen times the smallest diameter of the longitudinal reinforcement bar to be tied, and
      c) 300 mm
   B. Diameter-
      A. The diameter of the polygonal links or lateral ties shall not less than one fourth of the diameter of the largest longitudinal bar and in no case less than 16 mm i.e.
         • Greater of \[ \frac{\text{dia of main bar}}{4} \]
         • 6 mm
234. Spacing between longitudinal bars measured along the periphery of RCC columns should not exceed
a) 150mm
b) 250mm
c) 300mm
d) 500mm
234. Spacing between longitudinal bars measured along the periphery of RCC columns should not exceed

a) 150mm
b) 250mm
c) **300mm**
d) 500mm
235. Minimum area of reinforcement in RCC slab shall be

(a) $Fe_{415} = 0.12\% \text{ of total area}$
(b) $Fe_{250} = 0.15\% \text{ of total area}$
(c) Both a and b
(d) None
236. Minimum area of reinforcement in RCC slab shall be

(a) \( Fe \ 415 = 0.12\% \text{ of total area} \)

(b) \( Fe \ 250 = 0.15\% \text{ of total area} \)

(c) Both (a) and (b)

(d) None

Minimum area of reinforcement

- For \( Fe \ 415 = 0.12\% \text{ of total area} = 0.12\% \times B \times D \)
- For \( Fe \ 250 = 0.15\% \text{ of total area} = 0.15\% \times B \times D \)
237. Maximum diameter of steel bar in RCC slab

(a) \[ \frac{\text{Thickness of slab}}{3} \]
(b) \[ \frac{\text{Thickness of slab}}{8} \]
(c) \[ \frac{\text{Thickness of slab}}{4} \]
(d) \[ \frac{\text{Thickness of slab}}{6} \]
237. Maximum diameter of steel bar in RCC slab

(a) Thickness of slab
\[ \frac{3}{8} \]

(b) Thickness of slab
\[ \frac{8}{8} \]

(c) Thickness of slab
\[ \frac{4}{8} \]

(d) Thickness of slab
\[ \frac{6}{8} \]

Minimum area of reinforcement
- For Fe 415 = 0.12% of total area = 0.12% × B × D
- For Fe 250 = 0.15% of total area = 0.15% × B × D

Maximum diameter of steel bar in slab
\[ \varnothing_{\text{max}} = \frac{\text{Thickness of slab}}{8} \]

Maximum spacing of the reinforcement
a) Main bar = lesser of \[ \begin{cases} 3d \\ 300 \text{ mm} \end{cases} \]
b) Distribution bar = lesser of \[ \begin{cases} 5d \\ 450 \text{ mm} \end{cases} \]

‘d’ is the effective depth of slab.
238. Load Carrying capacity of column is increased by ...... percent when helical reinforcement is provided as a transverse reinforcement

(a) 5%
(b) 4%
(c) 6%
(d) 0.05%
238. Load Carrying capacity of column is increased by ...... percent when helical reinforcement is provided as a transverse reinforcement

(a) 5%
(b) 4%
(c) 6%
(d) 0.05%

\[ P = 1.05 \times Cr \times (\sigma_s A_s + \sigma_c A_c) \]
239. Minimum diameter of longitudinal bars in columns is
(a) 6 mm
(b) 8 mm
(c) 12 mm
(d) 16 mm
239. Minimum diameter of longitudinal bars in columns is

(a) 6 mm  
(b) 8 mm  
(c) 12 mm  
(d) 16 mm  

For columns, As per IS 456:2000, CL 26.5.3

1. Minimum percentage of steel = 0.8%  
2. Maximum percentage of steel  
   a) 4% if bar are lapped  
   b) 6% if bars are not lapped  
3. Minimum diameter of longitudinal bars = 12mm  
4. Minimum number of bars  
   a) For circular = 6  
   b) For Rectangular = 4  
5. Maximum spacing of longitudinal bars = 300mm
240. Effective length of column recommended by code for a column held in position and restrained against rotation in both ends is

(a) 0.8 L
(b) 0.65L
(c) L
(d) 2L
240. Effective length of column recommended by code for a column held in position and restrained against rotation in both ends is

(a) 0.8 L
(b) 0.65L
(c) L
(d) 2L
241. The effect of creep on modular ratio is

a) Modular ratio decreases
b) Modular ratio increases
c) Modular ratio either increases or decreases
d) Remains same
241. The effect of creep on modular ratio is

a) Modular ratio decreases
b) **Modular ratio increases**
c) Modular ratio either increases or decreases
d) Remains same

\[ m = \frac{E_s}{E_c} \]

\[ E_c = \frac{5000 \sqrt{f_{ck}}}{1 + \theta} \]
242. According to IS 456, the flexural strength of concrete is

a) Directly proportional to compressive strength

b) Inversely proportional to compressive strength

c) Directly proportional to square root of compressive strength

d) Inversely proportional to square root of compressive strength
242. According to IS 456, the flexural strength of concrete is

a) Directly proportional to compressive strength
b) Inversely proportional to compressive strength
c) Directly proportional to square root of compressive strength
d) Inversely proportional to square root of compressive strength

\[ f_{ct} = 0.7 \sqrt{f_{ck}} \]
243. According to IS 456, the approximate estimated flexural strength of concrete of grade M50 would be

a) 4.9  

b) 5.5  

c) 2.5  

d) 6.5
243. According to IS 456, the approximate estimated flexural strength of concrete of grade M50 would be

\[ f_{ct} = 0.7 \sqrt{f_{ck}} \]

a) 4.9

b) 5.5

c) 2.5

d) 6.5
244. For M20 grade of concrete, the maximum shear stress shall not exceed

a) $1.6 \, N/mm^2$

b) $1.9 \, N/mm^2$

c) $2.8 \, N/mm^2$

d) $2.2 \, N/mm^2$
244. For M20 grade of concrete, the maximum shear stress shall not exceed

a) $1.6 \, N/mm^2$

b) $1.9 \, N/mm^2$

c) $2.8 \, N/mm^2$

d) $2.2 \, N/mm^2$

Maximum shear stress should not be greater than $2.8 \, N/mm^2$.

<table>
<thead>
<tr>
<th>Grade of concrete</th>
<th>M15</th>
<th>M 20</th>
<th>M 25</th>
<th>M 30</th>
<th>M 35</th>
<th>M 40 and above</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\tau_{c , max}$</td>
<td>2.5</td>
<td>2.8</td>
<td>3.1</td>
<td>3.5</td>
<td>3.7</td>
<td>4.0</td>
</tr>
</tbody>
</table>
245. In singly reinforced beam, steel reinforcement is provided in

a) Tensile zone
b) Compressive zone
c) Both
d) Neutral zone
245. In singly reinforced beam, steel reinforcement is provided in

a) Tensile zone
b) Compressive zone
c) Both
d) Neutral zone
246. Deep beams are designed for

a) Shear force only
b) Bending moment only
c) Both shear force and bending moment
d) Bearing
246. Deep beams are designed for

a) Shear force only
b) **Bending moment only**
c) Both shear force and bending moment
d) Bearing

---

**Section Modulus (z)**

- It is the ratio of Moment of Inertia about the neutral axis to \( y_{\text{max}} \) (fiber which is at maximum distance from Neutral Axis) i.e.

\[
z = \frac{I_{NA}}{y_{\text{max}}}
\]

- Section Modulus represents Bending strength of the Section
- Greater the value of \( z \), greater the bending strength.
- The value of \( z \) depends upon Moment of Inertia and Distribution of Area

**Analysis of Bending Equations**

\[
M_R = \frac{\sigma_{\text{BENDING}}}{I_{NA}} = \frac{E}{y}
\]

- **CASE 1:** if \( \frac{\sigma_{\text{eq}}}{y} = \frac{M_R}{I_{NA}} \),

\[
(\sigma_B)_{\text{max}} = \frac{M_R \times y_{\text{max}}}{I_{NA}}
\]

\[
(\sigma_B)_{\text{max}} = \frac{M_R}{I_{NA}} \times y_{\text{max}}
\]

\[
(\sigma_B)_{\text{max}} = \frac{M_R}{y_{\text{max}}}
\]

- More the value of \( z \), more is the Bending strength and less is the bending stress
- More is the section modulus, more will be the Moment of Resistance for given bending stress
247. The RCC beam, curved in plane is designed for

a) Bending moment and shear
b) Bending moment and torsion
c) Bending moment
d) Bending moment, shear and torsion
247. The RCC beam, curved in plane is designed for

a) Bending moment and shear
b) Bending moment and torsion
c) Bending moment
d) **Bending moment, shear and torsion**
248. Spacing of main bars in an RCC slab shall not exceed

a) 3 times the effective depth
b) 3 times then overall depth
c) 30 times the dia of main bar
d) 30 cm
248. Spacing of main bars in an RCC slab shall not exceed

a) 3 times the effective depth
b) 3 times then overall depth
c) 30 times the dia of main bar
d) 30 cm

Maximum spacing of the reinforcement

a) Main bar = lesser of \(3d\) \(300 \text{ mm}\)
b) Distribution bar = lesser of \(5d\) \(450 \text{ mm}\)

‘d’ is the effective depth of slab.
249. As per IS 456, the minimum nominal cover specified for footing is

a) 25 mm  
b) 40 mm  
c) 50 mm  
d) 75 mm
249. As per IS 456, the minimum nominal cover specified for footing is

a) 25 mm
b) 40mm
c) 50mm
d) 75mm

1. Slab 20mm
2. Beam 25mm
3. Column 40mm
4. Foundation 50mm
250. A column is a structural member designed primarily to take

a) Torsional load
b) Tensile load
c) Compressive load
d) Shear
250. A column is a structural member designed primarily to take

a) Torsional load
b) Tensile load
c) Compressive load
d) Shear
251. Lateral ties in RCC columns are provided to resist

a) Bending moment
b) Shear
c) Buckling of longitudinal steel base
d) Both bending moment and shear
251. Lateral ties in RCC columns are provided to resist

a) Bending moment

b) Shear

c) Buckling of longitudinal steel base

d) Both bending moment and shear

• it prevents longitudinal reinforcement bars from buckling,
• it resists the shear force and hence contributes avoiding shear failure
252. When the slenderness ratio is less than 12, a compression

a) Short  
b) Slender  
c) Pedestal  
d) Short and slender
252. When the slenderness ratio is less than 12, a compression

a) Short

b) Slender

c) Pedestal

d) Short and slender

A column is said to be long column when slenderness ratio is equal to or more than 12

\[ \text{Slenderness ratio} = \frac{\text{Effective length}}{\text{Least lateral dimension}} \]
253. Column may be made of plain concrete if their least lateral dimension is

a) Two times effective length
b) Three times effective length
c) Four times effective length
d) Five times effective length
253.. Column may be made of plain concrete if their least lateral dimension is

a) Two times effective length
b) Three times effective length

c) Four times effective length
d) Five times effective length

Pedestal: It is a short column of effective length not greater than 3 times of least lateral dimension
254. The diameter of transverse reinforcement of columns should be equal to one fourth of the diameter of the main steel rods but not less than

a) 4mm  

b) 5mm  

c) 6mm  

d) 7mm
254. The diameter of transverse reinforcement of columns should be equal to one fourth of the diameter of the main steel rods but not less than

- a) 4mm
- b) 5mm
- c) 6mm
- d) 7mm

7. Pitch and diameter of lateral ties

A. The pitch of transverse reinforcement shall not more than the least of the following distances:
   - a) The least lateral dimension of the compression members;
   - b) Sixteen times the smallest diameter of the longitudinal reinforcement bar to be tied, and
   - c) 300 mm

B. Diameter-
   - A. The diameter of the polygonal links or lateral ties shall not less than one fourth of the diameter of the largest longitudinal bar and in no case less than 16 mm i.e.
     - Greater of \( \frac{\text{dia of main bar}}{6 \text{ mm}} \)
255. Spacing between longitudinal bars measured along the periphery of RCC columns should not exceed

a) 150mm
b) 250mm
c) 300mm
d) 500mm
255. Spacing between longitudinal bars measured along the periphery of RCC columns should not exceed

a) 150mm
b) 250mm
c) **300mm**
d) 500mm

7. Pitch and diameter of lateral ties

A. The pitch of transverse reinforcement shall not more than the least of the following distances:
   a) The least lateral dimension of the compression members;
   b) Sixteen times the smallest diameter of the longitudinal reinforcement bar to be tied, and
   c) 300 mm

B. Diameter-
   A. The diameter of the polygonal links or lateral ties shall not less than one fourth of the diameter of the largest longitudinal bar and in no case less than $16 \text{ mm}$ i.e.
   
   \[
   \text{Greater of } \left\{ \frac{\text{dia of main bar}}{4}, 6 \text{ mm} \right\}
   \]
256. The limit of percentage of longitudinal reinforcement in a column is given by

a) 0.15 - 2%
b) 0.8 - 4%
c) 0.8 - 6%
d) 0.8 – 8%
256. The limit of percentage of longitudinal reinforcement in a column is given by

a) 0.15 - 2%
   1. Minimum percentage of steel = 0.8%

b) 0.8 - 4%
   2. Maximum percentage of steel
      a) 4% if bars are lapped
      b) 6% if bars are not lapped

c) 0.8 - 6%
   3. Minimum diameter of longitudinal bars = 12mm

d) 0.8 – 8%
   4. Minimum number of bars
      a) For circular = 6
      b) For Rectangular = 4

   5. Maximum spacing of longitudinal bars = 300mm
257. As per I.S. 456 - 1978, the pH value of water shall be
(a) less than 6
(b) equal to 6
(c) not less than 6
(d) equal to 7
257. As per I.S. 456 - 1978, the pH value of water shall be
(a) less than 6
(b) equal to 6
(c) not less than 6
(d) equal to 7
258. Dead load comprises of
a) Permanently attached loads
b) Temporarily attached loads
c) Permanent as well as temporary loads
d) Snow loads
258. Dead load comprises of
a) **Permanently attached loads**
b) Temporarily attached loads
c) Permanent as well as temporary loads
d) Snow loads
259. For which of the following grades, ordinary concrete is not used?

a) M10
b) M40
c) M20
d) M25
259. For which of the following grades, ordinary concrete is not used?

a) M10  
b) **M40**  
c) M20  
d) M25
260. In how many types, RCC can be classified?

a) 2
b) 4
c) 3
d) 5
260. In how many types, RCC can be classified?

a) 2
b) 4

c) 3 Pre cast and Cast in situ
d) 5
261. A precast pile generally used is
a) Circular
b) Square
c) Octagonal
d) Square with corners chamfered
261. A precast pile generally used is
a) Circular
b) Square
c) Octagonal
d) *Square with corners chamfered*

As per IS 2911: Part 1 : Sec 3.
262. M15 concrete is used for
a) Dams
b) Foundations
c) RCC
d) Mass concreting works
262. M15 concrete is used for

a) Dam

b) Foundations

c) RCC

d) Mass concreting works
263. Tension bars in cantilever beam must be anchored in the support upto

a) $l_d$

b) $\frac{l_d}{3}$

c) $12\varphi$

d) $d$
263. Tension bars in cantilever beam must be anchored in the support upto

\( a) \ l_d \)

\( b) \ \frac{l_d}{3} \)

\( c) \ 12\varphi \)

\( d) \ d \)

\[
\text{LSM} \quad L_d = \frac{0.87 f_y \varphi}{4\tau_{bd}}
\]
264. When HYSD bars are used in place of mild steel, the bond strength-

a) Increases  
b) Decreases  
c) Does not change  
d) Becomes zero
264. When HYSD bars are used in place of mild steel, the bond strength—

a) Increases
b) Decreases
c) Does not change
d) Becomes zero

- For deformed bars conforming to IS 1786 these values shall be increased by 60 percent.
- For bars in compression, the values of bond stress for bars in tension shall be increased by 25 percent.

Deformed bars are rods of steels provided with lugs, ribs or deformation on the surface of bar, these bars minimize slippage in concrete and increases the bond between the two materials. Deformed bars have more tensile stresses than that of mild steel plain bars.
265. The length of straight portion of the bar, beyond the end of hook should be at least

a) Twice the diameter
b) Thrice the diameter
c) Four times the diameter
d) Seven times the diameter
265. The length of straight portion of the bar, beyond the end of hook should be atleast

a) Twice the diameter  
b) Thrice the diameter  
c) **Four times the diameter**  
d) Seven times the diameter
266. Lap length in compression shall not be less than

a) 15φ 

b) 20φ 

c) 24φ 

d) 30φ
266. Lap length in compression shall not be less than

a) 15φ
   • Lap length for bars (including anchorage value of hooks) in flexural tension shall be
     • Greater of $\frac{L_d}{30} \circ$

b) 20φ
   • Lap length for bars in direct tension shall be
     • Greater of $\frac{2L_d}{30} \circ$

c) 24φ
   • Splices in tension members shall be enclosed in spirals made of bars not less than 6 mm diameter with pitch not more than 100mm
   • The lap length in compression shall be equal to
     • Greater of $\frac{L_d}{24} \circ$

d) 30φ

Civil Engineering by Sandeep Jyani
267. If beam fails in bond, then its bond strength can be increased most economically by-

a) Increasing the depth of beam
b) Using thinner bars but more in number
c) Using thicker bars but less in number
d) Providing vertical stirrups
267. If beam fails in bond, then its bond strength can be increased most economically by-

a) Increasing the depth of beam

b) **Using thinner bars but more in number**

c) Using thicker bars but less in number

d) Providing vertical stirrups
268. If $\sigma_s$ is the shear stress in bar and $\tau_{bd}$ is the design bond stress then the development length of diameter $\phi$

a) $4\phi\sigma_s$

b) $\frac{\phi\sigma_s}{4\tau_{bd}}$

c) $\frac{2\phi\sigma_s}{3\tau_{bd}}$

d) $\frac{\phi\sigma_s}{3\tau_{bd}}$
268. If $\sigma_s$ is the shear stress in bar and $\tau_{bd}$ is the design bond stress then the development length of diameter $\phi$

a) $4\phi\sigma_s$

b) $\frac{\phi\sigma_s}{4\tau_{bd}}$

c) $\frac{2\phi\sigma_s}{3\tau_{bd}}$

d) $\frac{\phi\sigma_s}{3\tau_{bd}}$
269. The bond strength between steel and concrete is due to
a) Friction
b) Adhesion
c) Both of these
d) None of these
269. The bond strength between steel and concrete is due to
a) Friction
b) Adhesion
c) **Both of these**
d) None of these
270. Acc to IS 456-2000, side face reinforcement should be provided when depth of a beam exceeds
a) 650mm  
b) 700mm  
c) 725mm  
d) 750mm
270. Acc to IS 456-2000, side face reinforcement should be provided when depth of a beam exceeds

a) 650mm  
b) 700mm  
c) 725mm  
d) **750mm**
271. A T beam behaves as a rectangular beam of a width equal to its flange if its neutral axis
a) Falls within flange
b) Falls below flange
c) Coincides with the geometrical centre of beam
d) Falls below the centroidal axis of the beam
271. A T beam behaves as a rectangular beam of a width equal to its flange if its neutral axis

a) **Falls within flange**

b) Falls below flange

c) Coincides with the geometrical centre of beam

d) Falls below the centroidal axis of the beam
272. 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) 0.02 to 0.03% of the web area
d) Half of the longitudinal reinforcement
272. 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) 0.02 to 0.03% of the web area

d) Half of the longitudinal reinforcement
273. The assumption made in the theory of reinforced cement concrete beam is that

a) All the tensile stresses are taken up by the steel reinforcement only
b) The steel and concrete are stressed within its elastic limit
c) There is sufficient bond between steel and concrete
d) All of these
273. The assumption made in the theory of reinforced cement concrete beam is that

a) All the tensile stresses are taken up by the steel reinforcement only
b) The steel and concrete are stressed within its elastic limit
c) There is sufficient bond between steel and concrete
d) **All of these**
274. Torsion resisting capacity of a given reinforced concrete section ___

a) Decreases with decrease in stirrups spacing
b) Decreases with increase in longitudinal bars
c) Does not depend upon longitudinal bars and stirrups
d) Increases with increase in longitudinal bars and stirrups spacing
274. Torsion resisting capacity of a given reinforced concrete section

a) Decreases with decrease in stirrups spacing
b) Decreases with increase in longitudinal bars
c) Does not depend upon longitudinal bars and stirrups
d) **Increases with increase in longitudinal bars and stirrups spacing**
275. The width of flange of a T beam which may be considered to act effectively with the rib depends upon
a) Breadth of rib
b) Overall thickness of rib
c) Center to center distance between T beams
d) All of these
275. The width of flange of a T beam which may be considered to act effectively with the rib depends upon
a) Breadth of rib
b) Overall thickness of rib
c) Center to center distance between T beams
d) All of these
276. Though the effective depth of T beam is the distance between the top compression edge to the center of the tensile reinforcement for heavy loads it is taken as

a) 1/8 of the span
b) 1/10 of the span
c) 1/12 of span
d) 1/16 of span
276. Though the effective depth of T beam is the distance between the top compression edge to the center of the tensile reinforcement for heavy loads it is taken as

a) 1/8 of the span
b) 1/10 of the span
c) **1/12 of span**
d) 1/16 of span
277. The width of the rib of a T beam is generally kept between:

a) 1/7 to 1/3 of rib depth
b) 1/3 to 1/2 of rib depth
c) 1/2 to 3/4 of rib depth
d) 1/3 to 2/3 of rib depth
277. The width of the rib of a T beam is generally kept between:

a) 1/7 to 1/3 of rib depth
b) 1/3 to 1/2 of rib depth

c) 1/2 to 3/4 of rib depth
d) 1/3 to 2/3 of rib depth
278. Rolled steel angle sections are classified as
   a) Equal angles
   b) Unequal angles
   c) Bulb angles
   d) All of these
278. Rolled steel angle sections are classified as

a) Equal angles
b) Unequal angles
c) Bulb angles
d) **All of these**
Types of Sections

279. The heaviest I section for same depth is

a) ISLB
b) ISMB
c) ISHB
d) ISWB
Types of Sections

279. The heaviest I section for same depth is

a) ISLB

b) ISMB

c) ISHB

d) ISWB

i. ISLB 300
   • Indian standard light beam where overall depth is 300mm
   • Maximum bending stress is resisted by flange and maximum shear stress by web
   • Generally used in **roof beam**

ii. ISMB
    • Indian Standard Medium flange beam generally used in **floor beams**
    • **High moment of inertia about x-axis, so lateral buckling occurs about y-axis**

iii. ISWB
    • Indian standard wide flange beam generally used in **column**
    • **High moment of inertia about y-axis, so they have buckling strength about y axis**

iv. ISJB
    • Indian standard junior beam

v. ISHB
    • Indian standard heavy beam
280. Rolled steel T-sections are used as
   a) As columns
   b) With Flat strips to connect plates in steel rectangular tanks
   c) As built up sections to resist axial tension
   d) None of these
280. Rolled steel T-sections are used as

a) As columns

b) **With Flat strips to connect plates in steel rectangular tanks**

c) As built up sections to resist axial tension

d) None of these
Types of Sections

281. As per ISI rolled steel beam sections are classified into
a) Two series 
b) Three series 
c) Four series 
d) 5 series
282. As per ISI rolled steel beam sections are classified into
a) Two series
b) Three series
c) **Four series**
d) 5 series

As per IS 808:1989 Clause 5.1

1. **Beams**
2. **Columns**
3. **Channels**
4. **Angles**
283. Bulb angles are used in
a) Column Building
b) Bridge Building
c) Ship Building
d) Water tank building
Types of Sections

283. Bulb angles are used in
a) Column Building  
b) Bridge Building  
c) **Ship Building**  
d) Water tank building

*These provide better plate stiffening, they are highly resistant to Buckling*
284. Lug angle is
a) used with single angle member
b) Not used with double angle member
c) Used with channel member
d) All options are correct
Types of Sections

284. Lug angle is
a) used with single angle member
b) not used with double angle member
c) used with channel member
d) all options are correct
LUG ANGLES

• It is a small piece of angle used to connect the outstand leg of the structural member to the gusset plate.

• The purpose of lug angle is to reduce the length of connection to gusset plate and reduce the shear leg effect.
  • Shear leg effect is reduced by increasing the length of connection and by providing lug angles.

• If lug angle are used, the efficiency of tension members increases.

• If length is increased, then shear leg effect is decreased but efficiency is also decreased, if lug angle is used then efficiency is increased and shear leg is reduced
285. The permissible bending stress in steel is
a) $1500 \text{ kg/cm}^2$
b) $1890 \text{ kg/cm}^2$
c) $1900 \text{ kg/cm}^2$
d) $1300 \text{ kg/cm}^2$
285. The permissible bending stress in steel is

a) 1500 kg/cm$^2$

b)**1890 kg/cm$^2**

c) 1900 kg/cm$^2$

d) 1300 kg/cm$^2$
286. According to IS 800 1984, the permissible stress in axial tension in steel is 

\( a) 0.56f_y \)
\( b) 0.66f_y \)
\( c) 0.70f_y \)
\( d) 0.6f_y \)
286. According to IS 800 1984, the permissible stress in axial tension in steel is

\[ a) 0.56f_y \]
\[ b) 0.66f_y \]
\[ c) 0.70f_y \]
\[ d) 0.6f_y \]

i. Maximum permissible **AXIAL** stress in compression is given by

\[ \sigma_{ac} = 0.60 \, f_y \]

- Used in the design of columns and struts.
- Column is a compression member where bending moment exist while in case of struts, also being a compression member, bending moment is zero. Because strut is a component of roof trusses and roof trusses are pin jointed connection having bending moment equal to zero.

ii. Maximum permissible **AXIAL** stress in tension is given by

\[ \sigma_{at} = 0.60 \, f_y \]

It is used in design of tension members

- \( FOS = 1.67 \) for members subjected to AXIAL tension or compression
- \( FOS = 1.50 \) for members subjected to bending
287. Permissible stress may also be known as
a) Ultimate stress
b) Working stress
c) Limit stress
d) Yield stress
287. Permissible stress may also be known as
a) Ultimate stress
b) **Working stress**
c) Limit stress
d) Yield stress

\[
\text{Permissible stress} = \frac{f_y}{m}
\]

*Working stress should never be more than permissible stress*
288. The average shear stress for rolled beam section is
a) 845
b) 945
c) 1025
d) 1500
288. The average shear stress for rolled beam section is (kgF/cm²)

a) 845

\[ \text{Avg Shear stress} = 0.4f_y \]

b) 945

\[ \text{Avg Shear stress} = 0.4 \times 250 \frac{N}{mm^2} \]

c) **1025**

\[ \text{Avg Shear stress} = 100 \frac{N}{mm^2} \]

d) 1500

\[ \text{Avg Shear stress} = 1025 \frac{kg}{cm^2} \]

1 kgF/cm² = 0.098 N/mm²

Civil Engineering by Sandeep Jyani
289. The most economical
   a) Rectangular
   b) Solid round
   c) Flat strip
   d) Tubular section
289. The most economical
a) Rectangular
b) Solid round
c) Flat strip
d) Tubular section

- Great torsional resistance
- High buckling strength
- They are less subjected to wind loads due to round shape
290. Percentage increase of carbon in steel decreases its
a) Hardness
b) Ductility
c) Strength
d) Brittleness
290. Percentage increase of carbon in steel decreases its
a) Hardness
b) **Ductility**
c) Strength
d) Brittleness
291. Rolled steel beams are
a) Mainly used to resist bending stress
b) Used as independent sections to resist compressive stress
c) Used as independent sections to resist tensile stress
d) All options are correct
291. Rolled steel beams are
a) Mainly used to resist bending stress
b) Used as independent sections to resist compressive stress
c) Used as independent sections to resist tensile stress
d) *All options are correct*
292. A structural member subjected to tensile force in a direction parallel to its longitudinal axis is generally known as
a) A tie
b) A tie member
c) A tension member
d) All options are correct
292. A structural member subjected to tensile force in a direction parallel to its longitudinal axis is generally known as

a) A tie
b) A tie member
c) A tension member
d) All options are correct
293. The one that has least carbon content is
a) Wrought Iron
b) Cast iron
c) Mild steel
d) Pig iron
The one that has least carbon content is

a) **Wrought Iron**

- Pig iron (4–5%)
- > Cast Iron (2–4.5%)
- > Cast Steel (>2%)
- > Carbon steel (less than 2%)
- > High carbon steel (0.6–1.4%)
- > Medium carbon (0.25–0.6%)
- > Low carbon steel (less than 0.25%)
- > Wrought Iron (less than 0.1%)
- > Pure iron (0%)
294. The gross dia of a 14mm nominal dia of rivet is
a) 15.5mm
b) 16 mm
c) 16.5 mm
d) None
294. The gross dia of a 14mm nominal dia of rivet is

a) 15.5 mm  

b) 16 mm  

c) 16.5 mm  

d) None  

• **For nominal dia ≤ 25 mm**  
  - Gross dia = nominal dia + 1.5 mm, 
    \[ \text{dia of hole} = \varnothing + 1.5 \]  

• **For nominal dia > 25 mm**  
  - Gross dia = nominal dia + 2 mm, 
    \[ \text{dia of hole} = \varnothing + 2 \]
295. The strength of field rivets as compared to shop rivets is
a) Same
b) 90%
c) 89%
d) 75%
295. The strength of field rivets as compared to shop rivets is
a) Same
b) 90%
c) 89%
d) 75%
296. If $p$ and $d$ are pitch and gross diameter of rivets, the efficiency ($\eta$) of the riveted joint is given by

a) $\eta = \frac{p}{(p - d)}$

b) $\eta = \frac{p}{(p + d)}$

c) $\eta = \frac{(p - d)}{p}$

d) $\eta = \frac{(p + d)}{p}$
296. If p and d are pitch and gross diameter of rivets, the efficiency ($\eta$) of the riveted joint is given by

a) $\eta = \frac{p}{p - d}$

b) $\eta = \frac{p}{p + d}$

c) $\eta = \frac{p - d}{p}$

d) $\eta = \frac{p + d}{p}$

For Gauge Length:

$\Rightarrow \eta = \frac{(g - d) \times t \times F_t}{g \times t \times F_t} \times 100$

$\Rightarrow \eta = \frac{(g - d)}{g} \times 100$
297. Minimum pitch of the rivets shall not be less than

a) 1.5 d
b) 2.5 d
c) 2.0 d
d) 3.0 d
297. Minimum pitch of the rivets shall not be less than

- **a)** 1.5 d
- **b)** 2.5 d
- **c)** 2.0 d
- **d)** 3.0 d

**PITCH**
- Minimum pitch of rivet is \(2.5 \times \text{nominal dia of rivet}\).
- Maximum pitch of rivet or weld
  - **IN COMPRESSION**
    - The maximum pitch provision is provided to ensure the prevention of buckling between the connections
    - **Maximum pitch** = \(\min(12t \text{ or } 200\text{mm})\) where \(t\) is thickness for thinner plate
  - **IN TENSION**
    - The maximum pitch provision is provided to ensure the prevention of separation of plates between the connections
    - **Maximum pitch** = \(\min(16t \text{ or } 200\text{mm})\) where \(t\) is thickness for thinner plate
298. What should be multiplied with permissible bearing stress to find out strength of rivet in bearing?

\[ a) (p - d) t \]
\[ b) \frac{\pi}{4} d^2 \]
\[ c) \frac{\pi}{2} d^2 \]
\[ d) d \times t \]
298. What should be multiplied with permissible bearing stress to find out strength of rivet in bearing?

- $a) (p - d)t$
- $b) \frac{\pi}{4} d^2$
- $c) \frac{\pi}{2} d^2$
- $d) d \times t$

The correct formula for finding the strength of a rivet in bearing is

$$P_B = n \times (t \times d) \times F_b$$

Where:
- $n$ → total number of rivets at joint
- $t$ → thickness of thinner main plate
- $F_b$ → permissible shear stress in rivets

(300MPa in WSM)

$d$ → gross diameter of rivet (hole diameter)
299. Design of a riveted joint, is based on the assumption.

a) Load is uniformly distributed among all the rivets.

b) Shear stress on a rivet is uniformly distributed over its gross area.

c) Bearing stress is uniform between the contact surfaces of the plate and the rivet.

d) All option are correct.
299. Design of a riveted joint, is based on the assumption.

a) Load is uniformly distributed among all the rivets

b) Shear stress on a rivet is uniformly distributed over its gross area

c) Bearing stress is uniform between the contact surfaces of the plate and the rivet

d) All option are correct
Que 300. The distance measured along one rivet line from the center of a rivet to the center of adjoining rivet on an adjacent parallel rivet line is called______.  

a) pitch of rivet  
b) gauge distance of rivet  
c) staggered pitch  
d) All options are correct
300. The distance measured along one rivet line from the center of a rivet to the center of adjoining rivet on an adjacent parallel rivet line is called_____.

a) pitch of rivet
b) gauge distance of rivet
c) staggered pitch
d) All options are correct
301. When two plates are placed end to end and are joined by two cover plates, the joint is known as ______.

a) lap joint
b) butt joint
c) chain riveted lap joint
d) double cover butt joint
301. When two plates are placed end to end and are joined by two cover plates, the joint is known as_______.

a) lap joint
b) butt joint
c) chain riveted lap joint
d) **double cover butt joint**
302. An imaginary line along which rivets are placed is known as
   a) rivet line
   b) scrieve line
   c) back line
   d) all options are correct
302. An imaginary line along which rivets are placed is known as
a) rivet line
b) scrieve line
c) back line
d) all options are correct
303. Efficiency of a riveted joint is defined as the ratio of
a) least strength of a riveted joint to the strength of solid plate
b) greatest strength of a riveted joint to the strength of solid plate
c) least strength of a riveted plate to the greatest strength of the riveted joint
d) All option are correct
303. Efficiency of a riveted joint is defined as the ratio of

a) least strength of a riveted joint to the strength of solid plate

b) greatest strength of a riveted joint to the strength of solid plate

c) least strength of a riveted plate to the greatest strength of the riveted joint

d) All option are correct
304. A rivetted joint may fail in
a) Tearing of plate only
b) Shearing of rivet only
c) Bearing of plate or rivet only
d) Any of the above
304. A rivetted joint may fail in
a) Tearing of plate only
b) Shearing of rivet only
c) Bearing of plate or rivet only
d) Any of the above
305. The maximum permissible stress in shear for a power driven shop rivet is

a) 80
b) 90
c) 100
d) 250
305. The maximum permissible stress in shear for a power driven shop rivet is

a) 80
b) 90
c) 100
d) 250

<table>
<thead>
<tr>
<th></th>
<th>N/mm²</th>
<th>Axial Tension</th>
<th>Shearing</th>
<th>Bearing</th>
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<tbody>
<tr>
<td>PDS</td>
<td>100</td>
<td>100</td>
<td></td>
<td>300</td>
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<tr>
<td>PDF</td>
<td>90</td>
<td>90</td>
<td></td>
<td>270</td>
</tr>
<tr>
<td>HDF</td>
<td>80</td>
<td>80</td>
<td></td>
<td>250</td>
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</tbody>
</table>
306. The minimum edge and end distance from the centre of any hole to nearest outer edge shall not be less than

a) 1.5 times dia of hole
b) 1.7 times dia of hole
c) 2 times dia of hole
d) 1.5 times bolt/rivet
306. The minimum edge and end distance from the centre of any hole to nearest outer edge shall not be less than

a) 1.5 times dia of hole  

b) 1.7 times dia of hole  

c) 2 times dia of hole  

d) 1.5 times bolt/rivet  

**MINIMUM END AND EDGE DISTANCE**

- This recommendation is provided to prevent three types of failure in plates:
  - i. Splitting failure of plate
  - ii. Shearing failure of plate
  - iii. Bearing failure of plate
- Edge distance and end distance (minimum)
  - \( = 1.5 \times \text{gross dia of rivet} \) (machine cut element)
- The above provision is valid for the end distance and edge distance is done by **machine cut element**.
- Edge distance and end distance (minimum)
  - \( = 1.7 \times \text{gross dia of rivet} \) (hand driven elements)
- The above provision is valid for the end distance and edge distance is done by **hand driven elements**.
- But for analysis and design purpose, we adopt edge distance and end distance (minimum)
  - \( = 2.0 \times \text{gross dia of rivet} \).
307. The distance between two rivets measured perpendicular to the direction of applied force

a) Pitch

b) Gauge

c) Staggered pitch

d) Edge distance
307. The distance between two rivets measured perpendicular to the direction of applied force

a) Pitch
b) Gauge
c) Staggered pitch
d) Edge distance
308. Maximum spacing of tacking rivets is
a) 500 mm
b) 750 mm
c) 1000 mm
d) 1500 mm
308. Maximum spacing of **TACK RIVETS**

- a) 500 mm
- b) 750 mm
- c) 1000 mm
- d) 1500 mm

- They are the rivets used to make the structural component as a single unit.
- They don’t carry any load because we consider tack rivets not as a structural unit i.e., provided at the location of gusset plate.
- The maximum pitch provided in the case of tack rivet when two angle sections are placed back to back to gussete plate as
  - 1000mm in case of tension
  - Less than 600mm in case of compression
- The above recommendations are valid for both angle and channel section.
- When two plates are attached to a gussete plate back to back, then the maximum pitch is taken as
  - 32t or 300mm (whichever is minimum)
309. In fillet weld, the weakest section is
   a) Smaller side of the fillet
   b) Throat of the fillet
   c) Side perpendicular to the force
   d) Side parallel to the force
309. In fillet weld, the weakest section is
a) Smaller side of the fillet
b) Throat of the fillet
c) Side perpendicular to the force
d) Side parallel to the force
310. In calculating area to be deducted for the bolts of 36mm diameter, the diameter of hole shall be

a) 37.5 mm
b) 36 mm
c) 38 mm
d) 38.5 mm
310. In calculating area to be deducted for the bolts of 36mm diameter, the diameter of hole shall be

a) 37.5 mm
b) 36 mm
c) 38 mm
d) 38.5 mm
311. The type of welding used to connect two plates at a lap joint is called

a) Butt weld
b) Slot Weld
c) Plug weld
d) Fillet weld
311. The type of welding used to connect two plates at a lap joint is called

a) Butt weld
b) Slot Weld
c) Plug weld

d) Fillet weld
312. In a steel beam section, the web carries

a) the compression
b) the tension
c) the moment
d) the shear
312. In a steel beam section, the web carries
a) the compression
b) the tension
c) the moment
d) the shear
313. Which one of the following is the mode of failure in a fillet weld material?
   a) Tension
   b) Shear
   c) Bearing
   d) Crushing
313. Which one of the following is the mode of failure in a fillet weld material?

a) Tension
b) Shear
c) Bearing
d) Crushing
314. When the effect of wind or earthquake load is taken into account, the permissible stress as specified in rivets may be increased by
a) 33.33%
b) –50%
c) 10%
d) 25%
314. When the effect of wind or earthquake load is taken into account, the permissible stress as specified in rivets may be increased by

a) 33.33%  
b) –50%  
c) 10%  
d) 25%

1. As per WSM
   vi. Maximum permissible bending stress is given by
   \[ \sigma = 0.75 \, f_y \]

*Increase of permissible stress*

- When wind and earthquake load are considered, the permissible stresses in steel structure are increased by 33.33%.
- When wind and earthquake load are considered, the permissible stresses in connections (rivet and weld) are increased by 25%.
315. Design of a riveted joint, is based on the assumption.

a) Load is uniformly distributed among all the rivets
b) Shear stress on a rivet is uniformly distributed over its gross area
c) Bearing stress is uniform between the contact surfaces of the plate and the rivet
d) All option are correct
315. Design of a riveted joint, is based on the assumption.

a) Load is uniformly distributed among all the rivets

b) Shear stress on a rivet is uniformly distributed over its gross area

c) Bearing stress is uniform between the contact surfaces of the plate and the rivet

d) **All option are correct**
316. An electric pole is 5 m high and it is fixed to the ground. It carries a wire at the top and is free to move sideways over there. The effective length of the pole is
a) 3.25 m
b) 4.0 m
c) 5.0 m
d) 10.0 m
An electric pole is 5 m high and it is fixed to the ground. It carries a wire at the top and is free to move sideways over there. The effective length of the pole is

(a) 3.25 m
(b) 4.0 m
(c) 5.0 m
(d) **10.0 m**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Degree of End Restraint of Compression Members</th>
<th>Figure</th>
<th>Theo. Value of Effective Length</th>
<th>Recon. Value of Effective Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Effectively held in position and restrained against rotation in both ends</td>
<td></td>
<td>0.50 ( l )</td>
<td>0.65 ( l )</td>
</tr>
<tr>
<td>2</td>
<td>Effectively held in position at both ends, restrained against rotation at one end</td>
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<td>0.70 ( l )</td>
<td>0.80 ( l )</td>
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<tr>
<td>3</td>
<td>Effectively held in position at both ends, but not restrained against rotation</td>
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<td>1.00 ( l )</td>
<td>1.00 ( l )</td>
</tr>
<tr>
<td>4</td>
<td>Effectively held in position and restrained against rotation at one end, and at the other restrained against rotation but not held in position</td>
<td></td>
<td>1.00 ( l )</td>
<td>1.20 ( l )</td>
</tr>
<tr>
<td>5</td>
<td>Effectively held in position and restrained against rotation in one end, and at the other partially restrained against rotation but not held in position</td>
<td></td>
<td>–</td>
<td>1.50 ( l )</td>
</tr>
<tr>
<td>6</td>
<td>Effectively held in position at one end but not restrained against rotation, and at the other end restrained against rotation but not held in position</td>
<td></td>
<td>2.00 ( l )</td>
<td>2.00 ( l )</td>
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<tr>
<td>7</td>
<td>Effectively held in position and restrained against rotation at one end but not held in position nor restrained against rotation at the other end</td>
<td></td>
<td>2.00 ( l )</td>
<td>2.00 ( l )</td>
</tr>
</tbody>
</table>
317. Net sectional area of a tension member is equal to its gross section-area
a) plus the area of the rivet holes
b) divided by the area of the rivet holes
c) multiplied by the area of the rivet holes
d) minus the area of the rivet holes
317. Net sectional area of a tension member is equal to its gross section-area
a) plus the area of the rivet holes
b) divided by the area of the rivet holes
c) multiplied by the area of the rivet holes
d) minus the area of the rivet holes
318. A tension member, if subjected to possible reversal of stresses due to wind; the slenderness ratio of the member should not exceed
a) 180
b) 200
c) 250
d) 350
318. A tension member, if subjected to possible reversal of stresses due to wind; the slenderness ratio of the member should not exceed

<table>
<thead>
<tr>
<th>Option</th>
<th>Slenderness Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 180</td>
<td>A tension member in which reversal of direct stress due to loads other than wind or seismic forces occur.</td>
</tr>
<tr>
<td>b) 200</td>
<td>A member normally acting as a tie in roof truss or a bracing system but subjected to possible reversal of stresses resulting from the action of wind and earthquake forces.</td>
</tr>
<tr>
<td>c) 250</td>
<td>Members always under tension (other than pretensioned members).</td>
</tr>
<tr>
<td>d) 350</td>
<td></td>
</tr>
</tbody>
</table>

Civil Engineering by Sandeep Jyani
319. For simply supported beams, the allowable deflection shall not exceed
a) $1/325$ of span
b) $1/350$ of span
c) $1/375$ of span
d) $1/400$ of span
For simply supported beams, the allowable deflection shall not exceed

a) $\frac{1}{325}$ of span
b) $\frac{1}{350}$ of span
c) $\frac{1}{375}$ of span
d) $\frac{1}{400}$ of span

- Maximum permissible horizontal and vertical deflection is given by
  \[ \delta = \frac{\text{span}}{325} \] as per WSM.

- Maximum permissible horizontal and vertical deflection is given by
  a) If supported elements are not susceptible to cracking
  \[ \delta = \frac{\text{span}}{300} \]
  b) If supported elements are susceptible to cracking
  \[ \delta = \frac{\text{span}}{360} \]
320. The slenderness ratio of lacing bars should not exceed
a) 120
b) 145
c) 180
d) 100
320. The slenderness ratio of lacing bars should not exceed

a) 120
b) **145**
c) 180
d) 100

- Lacing member are idealised as truss element, i.e., they are subjected either to tension or compression.
- B.M. in lacing member is zero, to ensure that bending moment is zero, provide only one rivet at each end as far as possible.
- Maximum slenderness ratio $\lambda$ for lacing member is limited to 145.
- The angle of lacing w.r.t. vertical is 40° to 70° (welding 60° to 90°)
321. A column splice is used to increase
a) the strength of the column
b) the rigidity of the column
c) the cross-sectional area of the column
d) the length of the column
321. A column splice is used to increase
a) the strength of the column
b) the rigidity of the column
c) the cross-sectional area of the column
d) the length of the column
322. 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 80°
c) 40° to 70°
d) 20° to 70°
322. 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 80°
c) 40° to 70°
d) 20° to 70°

LACINGS

- Lacing member are idealised as truss element, i.e., they're subjected either to tension or compression.
- B.M. in lacing member is zero, to ensure that bending moment is zero, provide only one rivet at each end as far as possible.
- Maximum slenderness ratio $\lambda$ for lacing member is limited to 145.
- The angle of lacing w.r.t. vertical is 40° to 70° (welding 60° to 90°)
323. The effective length of battened column is increased by_____.

a) 10%
b) 7%
c) 12%
d) 25%
323. The effective length of battened column is increased by_____.

a) 10%
b) 7%
c) 12%
d) 25%

- It behave like very small beam member and subjected to bending moment.
- The effective length of battened column should be increased by 10%.
- Minimum number of battens provided = 4
- Provide batten on opposite faces such that one should be the mirror image of other.
324. What is the major difference between truss and beam?

a) Beam can’t transmit load in vertical direction while truss can
b) Truss can’t transmit load in vertical direction while beam can
c) Beam can’t transmit load in axial direction while truss can
d) Truss can’t transmit load in axial direction while beam can
324. What is the major difference between truss and beam?

a) Beam can’t transmit load in vertical direction while truss can

b) **Truss can’t transmit load in vertical direction while beam can**

c) Beam can’t transmit load in axial direction while truss can

d) Truss can’t transmit load in axial direction while beam can
325. When a tension member is made of four angles with a plates as web, the allowance for holes is made as
a) two holes for each angle and one hole for the web
b) one hole for each angle and one hole for the web
c) one hole for each angle and two holes for the web
d) None of these
325. When a tension member is made of four angles with a plates as web, the allowance for holes is made as
a) two holes for each angle and one hole for the web
b) one hole for each angle and one hole for the web
c) one hole for each angle and two holes for the web
d) None of these
326. According to I.S. : 800 – 1871, lacing bars resist transverse shear equal to ____.

a) 1.0% 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
326. According to I.S. : 800 – 1871, lacing bars resist transverse shear equal to _____.
   a) 1.0% 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

* Lacing system is designed to resist a transverse shear force of $V = 2.5\%$ of column load.
327. The slenderness ratio of a column is zero when its length is
a) zero
b) is equal to its radius of gyration
c) is supported on all sides throughout its length
d) None of these
327. The slenderness ratio of a column is zero when its length is
a) zero
b) is equal to its radius of gyration
c) is supported on all sides throughout its length
d) None of these
328. A plate used for connecting two or more structural members intersection each other is called
a) Template
b) base plate
c) Gusset plate
d) Anchor plate
328. A plate used for connecting two or more structural members intersection each other is called
a) Template
b) base plate
c) **Gusset plate**
d) Anchor plate
328. A plate used for connecting two or more structural members intersection each other is called
a) Template
b) base plate
c) **Gusset plate**
d) Anchor plate
329. The size of a rivet is identified by
   a) diameter of shank
   b) diameter of head
   c) length of shank
   d) shape of head
329. The size of a rivet is identified by
a) **diameter of shank**
b) diameter of head
c) length of shank
d) shape of head
330. The maximum permissible stress for power driven field rivet in bearing on rivet is
a) 100 N/mm²
b) 250 N/mm²
c) 270 N/mm²
d) 300 N/mm²
330. The maximum permissible stress for power driven field rivet in bearing on rivet is
a) 100 N/mm²
b) 250 N/mm²
c) 270 N/mm²
d) 300 N/mm²
331. The strength of fillet welds is
a) About 80 to 95 percent of the main member
b) Equal to that of the main member
c) More than that of the main member
d) Equal to or more than that of main member
331. The strength of fillet welds is
a) About 80 to 95 percent of the main member
b) Equal to that of the main member
c) More than that of the main member
d) Equal to or more than that of main member
332. Diameter of a rivet hole is made larger than the diameter of the rivet by
a) 1.0 mm of rivet diameter upto 12 mm
b) 1.5 mm for rivet diameter exceeding 25 mm
c) 2.0 mm for rivet diameter over 25 mm
d) None of these
332. Diameter of a rivet hole is made larger than the diameter of the rivet by
a) 1.0 mm of rivet diameter upto 12 mm
b) 1.5 mm for rivet diameter exceeding 25 mm
c) **2.0 mm for rivet diameter over 25 mm**
d) None of these
323. In a tension member if one or more than one rivet holes are off the line, the failure of the member depends upon
a) pitch
b) gauge
c) diameter of the rivet holes
d) All of these
323. In a tension member if one or more than one rivet holes are off the line, the failure of the member depends upon
a) pitch
b) gauge
c) diameter of the rivet holes
d) All of these
324. In a steel beam section, the web carries
a) the compression  
b) the tension  
c) the moment  
d) the shear
324. In a steel beam section, the web carries
a) the compression
b) the tension
c) the moment
d) the shear
325. Minimum thickness of main steel members, not exposed to weather, is:
   a) 4.5 mm
   b) 6.0 mm
   c) 8.0 mm
   d) 8.5 mm
325. Minimum thickness of main steel members, not exposed to weather, is:
   a) 4.5 mm
   b) 6.0 mm
   c) 8.0 mm
   d) 8.5 mm
326. Compression members always tend to buckle in the direction of the:

a) Least radius of gyration
b) Axis of load
c) Perpendicular to the axis of load
d) Minimum cross-section
326. Compression members always tend to buckle in the direction of the:

a) **Least radius of gyration**

b) Axis of load

c) Perpendicular to the axis of load

d) Minimum cross-section

\[ \gamma_{\text{min}} = \sqrt{\frac{I}{A}} \]
327. Web crippling in beams generally occurs at the points where
a) concentrated loads act
b) bending moment is maximum
c) shear force is maximum
d) deflection is maximum
327. Web crippling in beams generally occurs at the points where

a) **concentrated loads act**
b) bending moment is maximum
c) shear force is maximum
d) deflection is maximum
328. In a truss it is assumed that the members are joined by ___.
   a) Rough pins
   b) Smooth pins
   c) Either rough or smooth pins
   d) None of these
328. In a truss it is assumed that the members are joined by____.
a) Rough pins
b) **Smooth pins**
c) Either rough or smooth pins
d) None of these
327. The gross section of the web of a beam is defined as
a) depth of the beam multiplied by its web thickness
b) width of the flange multiplied by its web thickness
c) sum of the flange width and depth of the beam multiplied by the web thickness
d) None of these
327. The gross section of the web of a beam is defined as
a) **depth of the beam multiplied by its web thickness**
b) **width of the flange multiplied by its web thickness**
c) **sum of the flange width and depth of the beam multiplied by the web thickness**
d) None of these
328. The economical spacing of trusses varies from
a) L/3 to L/4
b) L/4 to L/5
c) L/4 to L/6
d) None of the above
328. The economical spacing of trusses varies from
a) L/3 to L/4
b) L/4 to L/5
c) L/4 to L/6
d) None of the above
329. The member of roof truss which supports the purlins is called as
a) Sag rod
b) Main strut
c) Principal rafter
d) Principal tie
329. The member of roof truss which supports the purlins is called as
a) Sag rod
b) Main strut
c) **Principal rafter**
d) Principal tie
330. In single laced column construction, the thickness of the flat lacing bars shall not be less than:

a) \( \frac{1}{15} \) th of the width of the lacing bar.

b) \( \frac{1}{30} \) th of the effective length of single lacing.

c) \( \frac{1}{40} \) th of the effective length of single lacing.

d) \( \frac{1}{10} \) th of the width of the lacing bar.
330. In single laced column construction, the thickness of the flat lacing bars shall not be less than:

a) \( \frac{1}{15} \) th of the width of the lacing bar.

b) \( \frac{1}{30} \) th of the effective length of single lacing.

c) \( \frac{1}{40} \) th of the effective length of single lacing.

d) \( \frac{1}{10} \) th of the width of the lacing bar.

**Minimum thickness of lacing member**

- \( t_{min} = \frac{l_1}{40} \) (for single lacing)
- \( t_{min} = \frac{l_1}{60} \) (for double lacing)
331. Which of the following elements of a pitched roof industrial steel building primarily resists lateral load parallel to the ridge?

a) bracings
b) purlins
c) truss
d) columns
331. Which of the following elements of a pitched roof industrial steel building primarily resists lateral load parallel to the ridge?

a) **bracings**  
b) purlins  
c) truss  
d) columns
332. The flange splice in plate girder is subjected to
a) axial force only
b) shear and axial force
c) bending moment and axial force
d) shear force and bending moment
332. The flange splice in plate girder is subjected to
a) **axial force only**
b) shear and axial force
c) bending moment and axial force
d) shear force and bending moment
333. In a grillage footing, the maximum shear force occurs at the
a) Edge of grillage beam
b) Center of base plate
c) Center of grillage beam
d) None of these
333. In a grillage footing, the maximum shear force occurs at the
a) Edge of grillage beam
b) **Center of base plate**
c) Center of grillage beam
d) None of these

*In grillage footing, maximum bending moment occurs at edge of base plate and maximum shear force occurs at centre of base plate*
334. According to I.S. : 800 – 1962 the permissible bending stress in steel slab plates is
a) 1500 kg/cm²
b) 1420 kg/cm²
c) 2125 kg/cm²
d) 1890 kg/cm²
334. According to I.S. : 800 – 1962 the permissible bending stress in steel slab plates is
a) 1500 kg/cm²
b) 1420 kg/cm²
c) 2125 kg/cm²
d) **1890 kg/cm²**
335. Shape factor for a circular section is equal to:

a) 1.00
b) 1.50
c) 2.34
d) 1.70
335. Shape factor for a circular section is equal to:
   a) 1.00
   b) 1.50
   c) 2.34
   d) 1.70

<table>
<thead>
<tr>
<th>SHAPE</th>
<th>SHAPE FACTOR</th>
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<tbody>
<tr>
<td>Triangle</td>
<td>2.343</td>
</tr>
<tr>
<td>Triangle</td>
<td>2.0</td>
</tr>
<tr>
<td>Rhombus</td>
<td>2.0</td>
</tr>
<tr>
<td>Rectangle and Square</td>
<td>1.50</td>
</tr>
<tr>
<td>Circle</td>
<td>1.698</td>
</tr>
<tr>
<td>Hollow circle</td>
<td>1.273</td>
</tr>
</tbody>
</table>
336. Maximum size of the fillet weld for a plate of square edge is
a) 1.5 mm less than the thickness of the plate.
b) one-half of the thickness of the plate.
c) thickness of the plate itself.
d) 1.5 mm more than the thickness of the plate.
336. Maximum size of the fillet weld for a plate of square edge is
a) 1.5 mm less than the thickness of the plate.
b) one-half of the thickness of the plate.
c) thickness of the plate itself.
d) 1.5 mm more than the thickness of the plate.

3. **MAXIMUM SIZE OF WELD**
   - It depends upon the thickness of thinner plate.
   - **CASE 1:** In square edge –
     \[
     \text{Max size of weld} = \text{thickness of thinner plate} - 1.5\text{mm}
     \]
   - **CASE 2:** At rounded edge –
     \[
     \text{Max size of weld} = \frac{3}{4}t \quad (75\% \text{ of the thickness of thinner plate})
     \]
337. The minimum edge and end distance from the centre of any hole to the nearest flame-cut edge shall not be less than
a) 1.5 times hole dia
b) 1.7 times hole dia
c) 2 times hole dia
d) 1.5 times bolt/rivet dia
337. The minimum edge and end distance from the centre of any hole to the nearest flame-cut edge shall not be less than

a) **1.5 times hole dia**
b) 1.7 times hole dia
c) 2 times hole dia
d) 1.5 times bolt/rivet dia

• **MINIMUM END AND EDGE DISTANCE**
  • This recommendation is provided to prevent three types of failure in plates:
    i. Splitting failure of plate
    ii. Shearing failure of plate
    iii. Bearing failure of plate
  • Edge distance and end distance (minimum)
    • $= 1.5 \times \text{gross dia of rivet}$ (machine cut element)
  • The above provision is valid for the end distance and edge distance is done by machine cut element.
338. The throat in a fillet weld is
a) larger side of the triangle of the fillet
b) hypotenuse of the triangle of the fillet
c) smaller side of the triangle of the fillet
d) perpendicular distance from the root to the hypotenuse
338. The throat in a fillet weld is
a) larger side of the triangle of the fillet
b) hypotenuse of the triangle of the fillet
c) smaller side of the triangle of the fillet
d) **perpendicular distance from the root to the hypotenuse**
339. The size of a fillet weld is indicated by:
   a) size of the plate
   b) side of the triangle of fillet
   c) throat of the fillet
   d) length of fillet weld
The size of a fillet weld is indicated by:

a) size of the plate
b) side of the triangle of fillet
c) throat of the fillet
d) length of fillet weld
340. The minimum size of fillet weld should _______
   a) not be less than 3mm
   b) be less than 3mm
   c) be less than 2mm
   d) greater than thickness of thinner part joined
340. The minimum size of fillet weld should ________

a) not be less than 3mm
b) be less than 3mm
c) be less than 2mm
d) greater than thickness of thinner part joined
341. What is the minimum specified length of fillet weld?
   a) two times the size of weld
   b) four times the size of weld
   c) six times the size of weld
   d) half the size of weld
341. What is the minimum specified length of fillet weld?
   a) two times the size of weld
   b) four times the size of weld
   c) six times the size of weld
   d) half the size of weld

   b) four times the size of weld
342. Effective length of fillet weld is ________
   a) equal to overall length plus twice the weld size
   b) twice the overall length plus twice the weld size
   c) equal to overall length minus twice the weld size
   d) twice the overall length minus twice the weld size
342. Effective length of fillet weld is ________
   a) equal to overall length plus twice the weld size
   b) twice the overall length plus twice the weld size
   c) equal to overall length minus twice the weld size
   d) twice the overall length minus twice the weld size

**IS RECOMMENDATIONS**

4. **EFFECTIVE LENGTH OF WELD**
   - It depends upon the size of weld.
   - Effective length of weld = Actual length of weld − 2 x size of weld
   - Effective length of weld should not be less than 4 times the size of weld
343. Which of the following is not true regarding effective throat thickness of weld?

a) Effective throat thickness should not be less than 3mm
b) It should not exceed 0.7t or 1t, where t is thickness of thinner plate of elements being welded
c) Effective throat thickness = K x size of weld, where K is a constant
d) Effective throat thickness = K x (size of weld)^2 , where K is a constant
343. Which of the following is not true regarding effective throat thickness of weld?

a) Effective throat thickness should not be less than 3mm
b) It should not exceed 0.7t or 1t, where t is thickness of thinner plate of elements being welded

c) Effective throat thickness = K x size of weld, where K is a constant

d) **Effective throat thickness = K x (size of weld)^2**, where K is a constant

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344. The effective throat thickness is $K$ times the size of weld. What is the value of $K$ when angle between fusion faces is $80^\circ$?

a) 0.5  
b) 0.65  
c) 0.7  
d) 1
344. The effective throat thickness is $K$ times the size of weld. What is the value of $K$ when angle between fusion faces is $80^\circ$?

a) 0.5  
b) 0.65  
c) 0.7  
d) 1
345. Which of the following is the hardest wood?
   a) Babul
   b) Chir
   c) Teak
   d) Shisham
345. Which of the following is the hardest wood?

a) Babul  
b) Chir  
c) Teak  
d) Shisham
346. The most valuable timber may be obtained from
a) Chir
b) Shisham
c) Sal
d) Teak
346. The most valuable timber may be obtained from
a) Chir
b) Shisham
c) Sal
d) Teak
347. The timber having maximum resistance against white ants is obtained from -

a) Chir  
b) Shisham  
c) Sal  
d) Teak
347. The timber having maximum resistance against white ants is obtained from -

a) Chir
b) Shisham
c) Sal
d) Teak
348. The hardwood is produced by which of the following trees.
a) chir  
b) Kail  
c) Pine  
d) Shisham
348. The hardwood is produced by which of the following trees.
  a) chir
  b) Kail
  c) Pine
  d) Shisham
349. Plywood is specified by:
   a) Weight
   b) Volume
   c) Thickness
   d) Number of layers
349. Plywood is specified by:

- a) Weight
- b) Volume
- **c) Thickness**
- d) Number of layers
350. The seasoning of timber is required to:
a) Soften the timber
b) Harden the timber
c) Strengthen the timber
d) Remove sap from the timber
350. The seasoning of timber is required to:

a) Soften the timber
b) Harden the timber
c) Strengthen the timber
d) Remove sap from the timber
351. Wastage of timber is the maximum is the case of:
   a) Ordinary sawing
   b) Tangential sawing
   c) Radial sawing
   d) Quarter sawing
351. Wastage of timber is the maximum is the case of:
   a) Ordinary sawing
   b) Tangential sawing
   c) **Radial sawing**
   d) Quarter sawing

D. **Radial Sawing**
   - Cuts are made parallel to the medullary rays/ radial directions
   - Decorative effect
   ✓ **Strongest Section** is obtained
   ✓ **Wastage is also maximum**
352. Seasoning of timber is done for removing
a) Knots from timber
b) Sap from timber
c) Roughness of timber
d) None of the above
352. Seasoning of timber is done for removing
a) Knots from timber
b) Sap from timber
c) Roughness of timber
d) None of the above
353. Plywood is made from 
  a) Common timber 
  b) Bamboo fibre 
  c) Teak wood only 
  d) Asbestos sheet
353. Plywood is made from

a) **Common timber**
b) Bamboo fibre
c) Teak wood only
d) Asbestos sheet
354. Generally wooden mould are made from
a) Plywood
b) Shisham wood
c) Deodar wood
d) Teak wood
354. Generally wooden mould are made from
a) Plywood
b) Shisham wood
c) Deodar wood
d) Teak wood
355. Age of a tree may be ascertained by:
a) Radius of its stem.
b) Circumference of its stem.
c) Number of branches.
d) Number of annual rings.
355. Age of a tree may be ascertained by:

a) Radius of its stem.
b) Circumference of its stem.
c) Number of branches.
d) **Number of annual rings.**
356. The age of trees can be understood by:
a) measuring the diameter of pith.
b) the thickness of bark.
c) Counting number of rings.
d) length of medullary rays.
356. The age of trees can be understood by:
   a) measuring the diameter of pith.
   b) the thickness of bark.
   c) **Counting number of rings.**
   d) length of medullary rays.
357. How does the seasoning of timbeber help?
A. It increases the weight of timber
B. It improves the strength properties of timber
a) Only A
b) Only B
c) Both A and B
d) None of these
357. How does the seasoning of timbeber help?
A. It increases the weight of timber
B. It improves the strength properties of timber
a) Only A
b) Only B
c) Both A and B
d) None of these
358. The life of teakwood doors and windows is usually taken to be____.
a) 80 year  
b) 60 year  
c) 40 year  
d) 20 year
358. The life of teakwood doors and windows is usually taken to be_____.
   a) 80 year
   b) 60 year
   c) 40 year
   d) 20 year
359. Which of the following is examined to determine the age of timber?
a) Annular ring
b) Sapwood
c) Pith
d) Timber defects
359. Which of the following is examined to determine the age of timber?

a) **Annular ring**
b) Sapwood
c) Pith
d) Timber defects
360. The defect in timber that arises due to the swelling caused by growth of layers of soap wood over the wounds after branch is cut off is called as _____.

a) Checks
b) Knots
c) shakes
d) Rind gall
360. The defect in timber that arises due to the swelling caused by growth of layers of soap wood over the wounds after branch is cut off is called as _____.

a) Checks
b) Knots
c) shakes
d) Rind gall
361. Due to attack of dry rot, the timber:
   a) Cracks
   b) Shrinks
   c) Reduces to powder
   d) None of these
361. Due to attack of dry rot, the timber:

a) Cracks
b) Shrinks

c) Reduces to powder

d) None of these
The age of a tree can be known by examining:

a) Cambium layer
b) Annular ring
c) Medullary rays
d) Heart wood
362. The age of a tree can be known by examining:
   a) Cambium layer
   b) **Annular ring**
   c) Medullary rays
   d) heart wood
363. Dry rot:
a) Cracks the timber.
b) Reduces the timber to powder.
c) Reduces the strength of timber.
d) Both b and c.
363. Dry rot :

a) Cracks the timber.
b) Reduces the timber to powder.
c) Reduces the strength of timber.
d) Both b and c.
364. The disease of dry rot in timber is caused by:

a) Complete submergence in water
b) Lack of ventilation
c) Alternate wet and dry conditions
d) None of these
364. The disease of dry rot in timber is caused by:

a) Complete submergence in water
b) **Lack of ventilation**
c) Alternate wet and dry conditions
d) None of these
365. Pick up the correct statement from the following method of sawing timber
a) Tangentially to annual rings, is known as tangential method
b) In four quarters such that each board cuts annual rings at angles not less than 45° is known as quarter sawing method.
c) Cut out of quarter logs, parallel to the medullary rays and perpendicular to annual rings is known as radial sawing
d) All option are correct
365. Pick up the correct statement from the following method of sawing timber
a) Tangentially to annual rings, is known as tangential method
b) In four quarters such that each board cuts annual rings at angles not less than 45° is known as quarter sawing method.
c) Cut out of quarter logs, parallel to the medullary rays and perpendicular to annual rings is known as radial sawing

d) All option are correct
366. Which of the seasoning method is adopted for the rapid seasoning of timber on large scale to obtain any desired moisture content?

a) Air seasoning  
b) Boiling Process  
c) Kiln Seasoning  
d) Water seasoning
366. Which of the seasoning method is adopted for the rapid seasoning of timber on large scale to obtain any desired moisture content?

a) Air seasoning
b) Boiling Process
c) Kiln Seasoning
d) Water seasoning
367. The defect in timber that causes longitudinal separation of woods between the annular rings is known as _____.
   a) Knots
   b) Rind gall
   c) Shakes
   d) Twisted fibers
367. The defect in timber that causes longitudinal separation of woods between the annular rings is known as ____.

a) Knots  
b) Rind gall  
**c) Shakes**  
d) Twisted fibers
368. For which of the following process boucherie process is used?
   a) manufacturing of bricks
   b) Manufacturing of cement
   c) production of clay tiles
   d) Treatment of green timber
368. For which of the following process boucherie process is used?

a) manufacturing of bricks  
b) Manufacturing of cement  
c) production of clay tiles  
d) **Treatment of green timber**

*a method of preserving wood involving impregnation with copper sulfate under pressure*
369. In which of the following case Bethel process is used?

a) Brick manufacturing  
b) Cement manufacturing  
c) manufacturing of bituminous material  
d) Treatment of timber
369. In which of the following case Bethel process is used?

a) Brick manufacturing  
b) Cement manufacturing  
c) manufacturing of bituminous material  
d) Treatment of timber
370. Which one of the following treatment is used to makes the timber fire resistance?
   a) Abel’s process
   b) Empty cell process
   c) Envelope treatment
   d) Tarring
370. Which one of the following treatment is used to makes the timber fire resistance?

a) Abel’s process
b) Empty cell process
c) Envelope treatment
d) Tarring
371. The strength of any timber is highest in direction of _____.
   a) An angle of 60 degree to grains
   b) An angle of 0 degree to grains
   c) An angle of 90 degree to grain
   d) An angle of 120 degree to grains
371. The strength of any timber is highest in direction of _____.
a) An angle of 60 degree to grains
b) An angle of 0 degree to grains
c) An angle of 90 degree to grain
d) An angle of 120 degree to grains
372. Which of the following represents the moisture content in the properly seasoned timber?

a) 5% to 8%

b) 10% to 12%

c) 18% to 25%

d) 25% to 35%
372. Which of the following represents the moisture content in the properly seasoned timber?

a) 5% to 8%

b) **10% to 12%**

c) 18% to 25%

d) 25% to 35%
373. In the air drying process, the practical limit of moisture content is ____.
a) 0.05
b) 0.15
c) 0.25
d) 0.35
373. In the air drying process, the practical limit of moisture content is ____.
   a) 0.05
   b) 0.15
   c) 0.25
   d) 0.35
374. Which of the following represents the average life (years) of high durable timber?

a) Less than 3
b) 3 to 6
c) 6 to 10
d) More than 10
374. Which of the following represents the average life (years) of high durable timber?

a) Less than 3  

b) 3 to 6  

c) 6 to 10  

d) More than 10

Classification on the basis of Durability

1. High durability: If the average life is more than 10 years.
2. Moderate durability: If the average life is 5-10 years.
3. Low durability: If the average life is less than 5 years.
375. The distemper is used to coat:
a) External concrete surface
b) Interior surface not exposed to weather
c) Woodwork
d) Compound walls
375. The distemper is used to coat:

a) External concrete surface
b) **interior surface not exposed to weather**
c) Woodwork
d) Compound walls
376. The most commonly used base for timber painting is
a) Red lead
b) Zinc white
c) White lead
d) Titanium white
376. The most commonly used base for timber painting is

a) Red lead
b) Zinc white

[**c) White lead**]
d) Titanium white
377. The most durable varnish is
a) Water varnish
b) Spirit varnish
c) Turpentine varnish
d) Oil varnish
377. The most durable varnish is
a) Water varnish
b) Spirit varnish
c) Turpentine varnish
d) Oil varnish
378. Snowcrete is one of the patent forms of

a) Distemper
b) Water proof cement paint
c) Enamel paint
d) cellulose paint
378. Snowcrete is one of the patent forms of

a) Distemper

b) **Water proof cement paint**

c) Enamel paint
d) cellulose paint
379. In paints, the pigment is responsible for:
  a) Durability
  b) Colour
  c) Smoothness
  d) Glassy face
379. In paints, the pigment is responsible for:
   a) Durability
   b) **Colour**
   c) Smoothness
   d) Glassy face
380. Resins are:
a) Not soluble in water
b) Soluble in spirit
c) used in varnishes
d) All the above
380. Resins are:
a) Not soluble in water
b) Soluble in spirit
c) used in varnishes
d) All the above
381. Resins are:
a) Not soluble in water.
b) Soluble in spirit.
c) used in varnishes.
d) left behind on evaporation of oil.
e) All of above
381. Resins are:

a) Not soluble in water.
b) Soluble in spirit.
c) used in varnishes.
d) left behind on evaporation of oil.

**e) All of above**
382. The commonly used thinner in oil paints is:
a) Naptha
b) Turpentine
c) Both (a) and (b)
d) Neither (a) or (b)
382. The commonly used thinner in oil paints is:
a) Naptha
b) Turpentine
c) Both (a) and (b)
d) Neither (a) or (b)
383. The volatile dilutents added to paint is known as:
   a) Dried
   b) Pigment
   c) Thinner
   d) Distemper
383. The volatile dilutents added to paint is known as:

a) Dried
b) Pigment

**c) Thinner**
d) Distemper
384. Putty is made up of:
   a) Red lead and linseed oil
   b) zinc oxide and boiled linseed oil
   c) White lead and turpentine
   d) powdered chalk and raw linseed oil
Putty is made up of:

a) Red lead and linseed oil
b) zinc oxide and boiled linseed oil
c) White lead and turpentine
d) powdered chalk and raw linseed oil
385. The base material for distemper is:
   a) Chalk
   b) Lime
   c) Clay
   d) Lime putty
385. The base material for distemper is:

a) Chalk
b) Lime
c) Clay
d) Lime putty
386. Zinc oxide is a pigment having colour ______
a) Blue
b) White
c) Yellow
d) Red
386. Zinc oxide is a pigment having colour ______
a) Blue  
**b) White**  
c) Yellow  
d) Red
387. In paints, methylated spirit, naphtha and turpentine are used as:
a) base
b) Binder
c) Solvent
d) Extender
387. In paints, methylated spirit, naphtha and turpentine are used as:
a) base
b) Binder
c) **Solvent**
d) Extender
388. Turpentine oil is used in paint as a
a) Base
b) Carrier
c) Drier
d) Thinner
388. Turpentine oil is used in paint as a
a) Base
b) Carrier
c) Drier
d) Thinner
389. The paints that are most resistant to fire are
a) Enamel paints
b) Aluminum paints
c) Asbestos paints
d) Cement paints
389. The paints that are most resistant to fire are
   a) Enamel paints
   b) Aluminum paints
   c) Asbestos paints
   d) Cement paints
390. The detachment of the paint film from the surface is known as _____.
   a) Chalking
   b) cracking
   c) Flaking
   d) Wrinkling
390. The detachment of the paint film from the surface is known as ______.
   a) Chalking
   b) cracking
   c) **Flaking**
   d) Wrinkling
391. Which of the following is the homogenous solution of resins in the alcohol?

a) Distemper  
b) Enamel paint  
c) Plastic paint  
d) Varnish
391. Which of the following is the homogenous solution of resins in the alcohol?
a) Distemper
b) Enamel paint
c) Plastic paint
d) Varnish
392. The ingredient of paint which are used to hide the surface irregularities and imparts color is known as _____.
a) Adultrants
b) Drier
c) Pigments
d) Solvents
393. The ingredient of paint which are used to hide the surface irregularities and imparts color is known as _____.

a) Adultrants
b) Drier
c) **Pigments**
d) Solvents
394. Which of the following is used as the vehicle in the enamel paints?

a) Linseed oil
b) Mustard
c) Varnish
d) Water
394. Which of the following is used as the vehicle in the enamel paints?

a) Linseed oil
b) Mustard
c) Varnish
d) Water
395. Which one of the following is used as a carrier in paint?

a) Almond oil
b) Linseed oil
c) Mustard oil
d) Olive oil
395. Which one of the following is used as a carrier in paint?

a) Almond oil  
**b) Linseed oil**  
c) Mustard oil  
d) Olive oil
396. The common admixture used to accelerate the initial set of concrete is:
a) Gypsum
b) Calcium chloride
c) Mixture of bitumen and inert material
d) By product of bitumen
396. The common admixture used to accelerate the initial set of concrete is:

a) Gypsum
b) Calcium chloride
c) Mixture of bitumen and inert material
d) By product of bitumen
397. The workability of concrete is influenced most by its:

a) Water-cement ratio
b) Aggregate cement ratio
c) Cement content
d) Water content
397. The workability of concrete is influenced most by its:
   a) **Water-cement ratio**
   b) Aggregate cement ratio
   c) Cement content
   d) Water content
398. Deleterious substances in aggregate are undesirable because they may:

a) Affect the strength workability and long term performance of concrete
b) Have intrinsic weakness, softness and fineness
c) Interfere with the chemical reaction of hydration
d) all option is correct
398. Deleterious substances in aggregate are undesirable because they may:

a) Affect the strength workability and long term performance of concrete

b) Have intrinsic weakness, softness and fineness

c) Interfere with the chemical reaction of hydration

d) all option is correct
399. Workability of concrete for a given water content is good if the aggregates are
a) Rounded aggregate
b) Irregular aggregate
c) Angular aggregate
d) Flaky aggregate
399. Workability of concrete for a given water content is good if the aggregates are

a) Rounded aggregate
b) Irregular aggregate
c) Angular aggregate
d) Flaky aggregate
400. The compaction of concrete improves
a) Density
b) Strength
c) Durability
d) all option are correct
400. The compaction of concrete improves
a) Density
b) Strength
c) Durability
d) all option are correct
401. For preparing a test specimen it is necessary
a) To mix cement and fine aggregate by dry hand
b) To mix coarse aggregate
c) To mix water to the cement fine aggregates and coarse aggregates
d) All option are correct
401. For preparing a test specimen it is necessary
a) To mix cement and fine aggregate by dry hand
b) To mix coarse aggregate
c) To mix water to the cement fine aggregates and coarse aggregates
d) All option are correct
402. Workability of concrete mix with low water cement ratio is determined by
a) Tensile strength test
b) Slump test
c) Compaction factor test
d) Flexure strength test
402. Workability of concrete mix with low water cement ratio is determined by
a) Tensile strength test  
b) Slump test  
c) Compaction factor test  
d) Flexure strength test
403. The showing up of white fluffy layers on the surface of concrete is termed as ____.

a) Consistency
b) Efflorescence
c) Segregation
d) Workability
403. The showing up of white fluffy layers on the surface of concrete is termed as _____.

a) Consistency
b) Efflorescence
c) Segregation
d) Workability
404. For proper workability of concrete the water cement ratio varies from _____.
   a) 0.1 to 0.2
   b) 0.2 to 0.4
   c) 0.4 to 0.6
   d) 0.6 to 0.8
404. For proper workability of concrete the water cement ratio varies from _____.

a) 0.1 to 0.2

b) 0.2 to 0.4

c) 0.4 to 0.6

d) 0.6 to 0.8
405. Separation of coarse aggregate from mortar during transportation is known.
    a) Bleeding
    b) Creeping
    c) Segregation
    d) Shrinkage
405. Separation of coarse aggregate from mortar during transportation is known.

a) Bleeding
b) Creeping
c) Segregation
d) Shrinkage
406. Water cement ratio is
a) Volume of water to that of cement
b) Weight of water to that of cement
c) Both volume of water to that of cement and weight of water to that of cement
d) Weight of concrete to that of water
406. Water cement ratio is
a) Volume of water to that of cement
b) Weight of water to that of cement
c) Both volume of water to that of cement and weight of water to that of cement
d) Weight of concrete to that of water
407. Higher workability of a concrete is required if a structure is
a) Mode with cement
b) Thick and reinforced
c) Thin and heavily reinforced
d) Thick and heavily reinforced
407. Higher workability of a concrete is required if a structure is
a) Mode with cement
b) Thick and reinforced
c) Thin and heavily reinforced
d) Thick and heavily reinforced
408. What is the bottom diameter (mm) of the standard mould used in slump test of the concrete?

a) 50  
b) 100 
c) 150  
d) 200
408. What is the bottom diameter (mm) of the standard mould used in slump test of the concrete?

a) 50
b) 100
c) 150
d) 200
409. If the size of specimen used to test the compressive strength of concrete is decreased, then compressive strength of concrete will

a) Decrease
b) Do not affected
c) First decreases then increases
d) Increases
409. If the size of specimen used to test the compressive strength of concrete is decreased, then compressive strength of concrete will

a) Decrease
b) Do not affected
c) First decreases then increases
d) Increases
410. Which of the following is the results of proper batching of concrete?
A) Economy
B) Durability
C) Workability
D) Strength
a) A and B only
b) A, B and C only
c) A and D only
d) A, B, C and D
410. Which of the following is the results of proper batching of concrete?
A) Economy
B) Durability
C) Workability
D) Strength
a) A and B only
b) A, B and C only
c) A and D only
d) A, B, C and D
411. The process of mixing, transporting, placing and compacting concrete using ordinary Portland cement should not take more than how much time?

a) 30 minutes  
b) 40 minutes  
c) 75 minutes  
d) None of these
411. The process of mixing, transporting, placing and compacting concrete using ordinary Portland cement should not take more than how much time?

a) 30 minutes
b) 40 minutes
c) 75 minutes
d) None of these
412. If the effective area of a warehouse is 54 sq.m and maximum height of piles permitted is 270 cm, then what is the number of cement bag that can be stored?

a) 200  
b) 2000  
c) 24000  
d) None of these
412. If the effective area of a warehouse is 54 sq.m and maximum height of piles permitted is 270 cm, then what is the number of cement bag that can be stored?

a) 200  
b) 2000  
c) 24000  
d) None of these
413. How does the strength of concrete differ with age of concrete?

a) Increases  
b) Decreases  
c) No effect  
d) Increases, then decreases
413. How does the strength of concrete differ with age of concrete?

a) Increases  
b) Decreases  
c) No effect  
d) Increases, then decreases
414. Bleeding is good to an extent if it occurs when concrete is
a) Transported
b) Mixed
c) Plastic
d) Placed
414. Bleeding is good to an extent if it occurs when concrete is
a) Transported
b) Mixed
c) Plastic
d) Placed
415. the size of commonly used concrete specimen for compression test is:
a) 50 × 30 mm  
b) 150 × 150 × 150 mm  
c) 150 × 50 × 50 mm  
d) 150 × 150 mm
415. The size of commonly used concrete specimen for compression test is:

a) $50 \times 30$ mm
b) $150 \times 150 \times 150$ mm
c) $150 \times 50 \times 50$ mm
d) $150 \times 150$ mm
416. ________ are used to press mortar and spread if uniformly.
a) Trowel
b) Aluminum rod
c) Floats
d) Brush
416. ________ are used to press mortar and spread if uniformly.
a) Trowel  
b) Aluminum rod  
c) Floats  
d) Brush
417. The ratio of various ingredients (cement, sand, aggregates) in concrete of grade M20 is
A) 1 : 2 : 4
B) 1 : 3 : 6
C) 1 : 1.5 : 3
D) 1 : 1 : 2
a) Only A
b) Only B
c) Only C
d) Only D
417. The ratio of various ingredients (cement, sand, aggregates) in concrete of grade M20 is
A) 1 : 2 : 4
B) 1 : 3 : 6
C) 1 : 1.5 : 3
D) 1 : 1 : 2
a) Only A
b) Only B
c) Only C
d) Only D
418. What do we need to do while designing an air entrained concrete?

a) Water cement ratio is to be reduced
b) proportion of aggregates is to be reduced
c) An allowance for the entrained air is made
d) all option are correct
418. What do we need to do while designing an air entrained concrete?
a) Water cement ratio is to be reduced
b) proportion of aggregates is to be reduced
c) An allowance for the entrained air is made
d) all option are correct
419. In the concrete mix with proportions of its ingredient 1:3:6, the actual quantity of sand per unit volume of cement, it bulking of sand is 15% is ____.

a) 3
b) 3.45
c) 6
d) 4
419. In the concrete mix with proportions of its ingredient 1 : 3 : 6, the actual quantity of sand per unit volume of cement, its bulking of sand is 15% is ____.

a) 3
b) 3.45
c) 6
d) 4
420. ______ is added to make white concrete.
a) Fly ash
b) Metakaolin
c) Rice husk
d) Figments
420. ______ is added to make white concrete.
   a) Fly ash
   b) Metakaolin
   c) Rice husk
   d) Figments
421. Which process comes after batching in manufacture process of concrete?
  a) Transportation
  b) Placing
  c) Mixing
  d) Compacting
422. Which process comes after batching in manufacture process of concrete?
   a) Transportation
   b) Placing
   c) Mixing
   d) Compacting
423. Steam curing of concrete is adopted for
a) Precast structure
b) Columns
c) beams
d) Walls
423. Steam curing of concrete is adopted for
a) **Precast structure**
b) Columns
c) beams
d) Walls
424. Which of the following statement is true?
A) Workability reduces with time
B) Workability does not reduce with time
C) Workability remains constant with time

a) Only A
b) Only B
c) Only C
d) None of these
424. Which of the following statement is true?
A) Workability reduces with time
B) Workability does not reduces with time
C) Workability remains constant with time

a) Only A  
b) Only B  
c) Only C  
d) None of these
425. The result of Vee-Bee test is expressed in terms of
a) S
b) m
c) N/mm²
d) kg
425. The result of Vee-Bee test is expressed in terms of
a) S
b) m
c) N/mm²
d) kg
426. Which of the following statement is true?

a) The quality of water governs the strength of concrete
b) The quantity of water required for concreting, depends upon the grading of aggregate and method of compaction
c) 10\% excess of water reduces the strength of concrete by 15\%
d) All option are correct
426. Which of the following statement is true?

a) The quality of water governs the strength of concrete

b) The quantity of water required for concreting, depends upon the grading of aggregate and method of compaction

c) 10% excess of water reduces the strength of concrete by 15%

d) All option are correct
427. The 28 days cube strength of mass concrete using aggregates of maximum size 5 cm for gravity dams should be
a) Between 150 to 300 kg/sq cm
b) Between 350 to 600 kg/sq cm
c) Between 150 to 500 kg/sq cm
d) Below 200 kg/sq. cm
427. The 28 days cube strength of mass concrete using aggregates of maximum size 5 cm for gravity dams should be

a) Between 150 to 300 kg/sq cm
b) Between 350 to 600 kg/sq cm
c) Between 150 to 500 kg/sq cm
d) Below 200 kg/sq. cm
428. Which of the following refers to the process of proper and accurate measurement of concrete ingredients for uniformity of proportion?

a) Grading  
b) Curing  
c) Mixing  
d) batching
428. Which of the following refers to the process of proper and accurate measurement of concrete ingredients for uniformity of proportion?

a) Grading  
b) Curing  
c) Mixing  
d) batching

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429. What are the dimension of a 35 litre forms for measuring aggregates by volume?
a) Length 30 cm, breadth 25 cm, height 30 cm
b) Length 39 cm, breadth 25 cm, height 32 cm
c) Length 27 cm, breadth 27 cm, height 48 cm
d) Length 220 cm, breadth 25 cm, height 40 cm
430. What are the dimension of a 35 litre forms for measuring aggregates by volume?
a) Length 30 cm, breadth 25 cm, height 30 cm
b) Length 39 cm, breadth 25 cm, height 32 cm
c) **Length 27 cm, breadth 27 cm, height 48 cm**
d) Length 220 cm, breadth 25 cm, height 40 cm
431. The dynamic modulus of elasticity of sample of concrete is compared in ____.
   a) Compression test
   b) Split test
   c) Tension test
   d) Ultrasonic pulse velocity test
431. The dynamic modulus of elasticity of sample of concrete is compared in ____.
   a) Compression test
   b) Split test
   c) Tension test
   d) Ultrasonic pulse velocity test
432. The risk of segregation is more for
a) Water mix
b) Larger proportion of maximum size aggregates
c) Coarser grinding
d) all option are correct
432. The risk of segregation is more for
a) Water mix
b) Larger proportion of maximum size aggregates
c) Coarser grinding
d) all option are correct
433. How many components are mainly used to prepare concrete?

a) 5
b) 3
c) 2
d) 4
433. How many components are mainly used to prepare concrete?

a) 5
b) 3
c) 2
d) 4
434. Retarders are used for
a) Construction of high rise building
b) Repair works
c) Cold weather condition
d) Grouting deep oil wells
434. Retarders are used for
a) Construction of high rise building
b) Repair works
c) Cold weather condition
d) **Grouting deep oil wells**
435. What is the ratio of components is grade M-20 concrete?
A) 1 : 3 : 6
B) 1 : 15 : 3
C) 1 : 1 : 2
d) 1 : 2 : 4
a) Only A
b) Only B
c) Only C
d) Only D
What is the ratio of components is grade M-20 concrete?
A) 1 : 3 : 6
B) 1 : 15 : 3
C) 1 : 1 : 2
d) 1 : 2 : 4
a) Only A
b) Only B
c) Only C
d) Only D

\[ M5 \rightarrow 1:5:10 \quad M15 \rightarrow 1:2:4 \]
\[ M7.5 \rightarrow 1:4:8 \quad M20 \rightarrow 1:1.5:3 \]
\[ M10 \rightarrow 1:3:6 \quad M25 \rightarrow 1:1:2 \]
436. How many types of machine mixes of concrete are available?

a) 2
b) 5
c) 6
d) 3
436. How many types of machine mixes of concrete are available?

a) 2
b) 5
c) 6
d) 3
437. Excess vibration during compaction of concrete can lead to
a) Bleeding
b) Segregation
c) High strength
d) Air bubbles
437. Excess vibration during compaction of concrete can lead to
a) Bleeding
b) Segregation
c) High strength
d) Air bubbles
438. Sea water
a) Contains a salinity of about 3.5 percent
b) Corrodes the reinforcement of R.C.C
c) Accelerates the setting time of cement
d) all option are correct
438. Sea water
a) Contains a salinity of about 3.5 percent
b) Corrodes the reinforcement of R.C.C
c) Accelerates the setting time of cement
d) all option are correct
439. If the slump of a concrete mix is 60 mm, its workability is
a) Very low
b) Low
c) Medium
d) High
439. If the slump of a concrete mix is 60 mm, its workability is
a) Very low
b) Low
**c) Medium**
d) High
440. What is standard size of the cubes (mm) which is used to calculate the strength of concrete?

a) 20
b) 60
c) 70
d) 150
440. What is standard size of the cubes (mm) which is used to calculate the strength of concrete?

a) 20
b) 60
c) 70
d) 150
441. The lower water cement ratio in concrete, introduces
a) Smaller creek and shrinkage
b) Greater density and smaller permeability
c) Improved frost resistance
d) all option are correct
441. The lower water cement ratio in concrete, introduces
a) Smaller crack and shrinkage
b) Greater density and smaller permeability
c) Improved frost resistance
d) all option are correct
442. To obtain a very high strength, concrete, use very fine grained.
   a) Granite
   b) magnetite
   c) Barite
   d) Volcanic scoria
442. To obtain a very high strength, concrete, use very fine grained.

a) Granite
b) magnetite
c) Barite
d) Volcanic scoria
443. Tensile strength of concrete is found out using:
   a) CTM
   b) Gradual tensile test
   c) Split tensile test
   d) Radial tensile test
443. Tensile strength of concrete is found out using:
a) CTM
b) Gradual tensile test
c) Split tensile test
d) Radial tensile test
444. Compaction of concrete is done to:
   a) Place concrete on flat surface
   b) Remove air bubbles
   c) Place concrete on sloping surface
   d) Introduce air bubbles
444. Compaction of concrete is done to:

a) Place concrete on flat surface

b) Remove air bubbles

c) Place concrete on sloping surface

d) Introduce air bubbles
445. The final operation of finishing floors is known as:
a) Floating  
b) Finishing  
c) Trowelling  
d) All are correct
445. The final operation of finishing floors is known as:

a) Floating
b) Finishing
c) Trowelling
d) All are correct
446. $W_p$ and $W_f$ are the weights of a cylinder, containing partially compacted and fully compacted concrete. If the compaction factors ($W_p/W_f$) is 0.95, the workability of concrete is:

a) Extremely low
b) Very low
c) Low
d) High
446. \( W_p \) and \( W_f \) are the weights of a cylinder, containing partially compacted and fully compacted concrete. If the compaction factors \( \frac{W_p}{W_f} \) is 0.95, the workability of concrete is:

a) Extremely low  
b) Very low  
c) Low  
d) High
447. What is the ratio (approximate) of 7 days and 28 days strength of cement concrete

a) 0.45  
b) 0.65  
c) 0.95  
d) 1.15
447. What is the ratio (approximate) of 7 days and 28 days strength of cement concrete

a) 0.45  
b) 0.65  
c) 0.95  
d) 1.15
448. What is the maximum height through which concrete can be poured?

a) 0.1 to 0.6 ,
b) 0.8 to 1 m

c) 0.5 m

d) 2 m
448. What is the maximum height through which concrete can be poured?
   a) 0.1 to 0.6 ,
   b) 0.8 to 1 m
   c) 0.5 m
   d) 2 m
Que 449. For a given discharge, the efficiency of sedimentation tank can be increased by
a) Increasing the depth of tank
b) Decreasing the depth of tank
c) Increasing the surface area of tank
d) Decreasing the surface area of tank
Que 449. For a given discharge, the efficiency of sedimentation tank can be increased by
a) Increasing the depth of tank
b) Decreasing the depth of tank
c) **Increasing the surface area of tank**
d) Decreasing the surface area of tank

For small particles, Low overflow rate is required, hence surface area is increased

\[ \text{Surface overflow rate} \quad V_0 = \frac{Q}{BL} \]
Que 450. Alum as a coagulant is found to be most effective when pH range of water is

a) 2 to 4
b) 4 to 6
c) 6 to 8
d) 8 to 10
Que 450. Alum as a coagulant is found to be most effective when pH range of water is
a) 2 to 4
b) 4 to 6
c) 6 to 8
d) 8 to 10
Que 451. The detention period in coagulation tanks is usually kept as

a) 1 to 2 minutes
b) 30 to 45 minutes
c) 2 to 6 hours
d) 2 to 6 days
Que 451. The detention period in coagulation tanks is usually kept as
a) 1 to 2 minutes
b) 30 to 45 minutes
c) 2 to 6 hours
d) 2 to 6 days
Que 452. The rate of filtration in slow sand filters in million liters per day per hectare is about

a) 50 to 60
b) 100 to 150
c) 500 to 600
d) 1400 to 1500
Que 452. The rate of filtration in slow sand filters in million liters per day per hectare is about

a) 50 to 60
b) 100 to 150
c) 500 to 600
d) 1400 to 1500
Que 453. As compared to rapid sand filters, slow sand filters give
A. Slower filtration rate
B. Higher filtration rate
C. Lesser efficiency in removal of bacteria
D. Higher efficiency in removal bacteria
The correct answer is
a) A and B
b) B and C
c) A and D
d) B and D
Que 453. As compared to rapid sand filters, slow sand filters give
A. Slower filtration rate
B. Higher filtration rate
C. Lesser efficiency in removal of bacteria
D. Higher efficiency in removal bacteria
The correct answer is
a) A and B  
b) B and C  
c) A and D  
d) B and D
Que 454. Facultative bacteria are able to work in
a) Presence of oxygen only
b) Absence of oxygen only
c) Presence as well as in absence of oxygen
d) Presence of water
Que 454. Facultative bacteria are able to work in
a) Presence of oxygen only
b) Absence of oxygen only
c) Presence as well as in absence of oxygen
d) Presence of water
Que 455. The means of access for inspection and cleaning of sewer line is known as
a) Inlet
b) Manhole
c) Drop manhole
d) Catch basin
Que 455. The means of access for inspection and cleaning of sewer line is known as

a) Inlet

b) Manhole

c) Drop manhole

d) Catch basin
Que 456. Sewerage system is designed for
a) maximum flow only
b) Minimum flow only
c) Average flow only
d) Maximum and minimum flow
Que 456. Sewerage system is designed for

a) maximum flow only
b) Minimum flow only
c) Average flow only
d) **Maximum and minimum flow**
Que 457. Laying of sewers is usually done with the help of
a) Theodolite
b) Compass
c) Sight rails and boning rod
d) A plane table
Que 457. Laying of sewers is usually done with the help of
a) Theodolite
b) Compass
c) **Sight rails and boning rod**
d) A plane table
Que 458. Corrosion in Concrete Sewers is caused by
a) Septic conditions
b) Dissolved oxygen
c) Chlorine
d) nitrogen
Que 458. Corrosion in Concrete Sewers is caused by

a) Septic conditions
b) Dissolved oxygen
c) Chlorine
d) nitrogen

Hydrogen Sulphide is produced in Sewer lines and it gets oxidized to Sulphuric acid which reacts with the constituents of Cement which forms $\text{CaSO}_4$ to occupy greater volume than the compounds they replace.
Que 459. The minimum recommended diameter of sewers, is
a) 5cm
b) 10cm
c) 15cm
d) 20cm
Que 459. The minimum recommended diameter of sewers, is

a) 5cm
b) 10cm
c) **15cm**
d) 20cm
Que 460. Aerobic bacterias
a) Flourish in the presence of free oxygen
b) consume organic matter as their food
c) oxidise organic matter in sewage
d) All the above.
Que 460. Aerobic bacterias
a) Flourish in the presence of free oxygen
b) consume organic matter as their food
c) oxidise organic matter in sewage
d) All the above.
Que 461. A rainfall may be classified as acidic if its pH value is less or equal to

a) 6
b) 7
c) 5
d) 6.5
Que 461. A rainfall may be classified as acidic if its pH value is less or equal to

a) 6
b) 7
c) 5
d) 6.5
Que 462. The gradient of sewers depends upon
a) velocity of flow
b) diameter of the sewer
c) Discharge
d) all the above.
Que 462. The gradient of sewers depends upon
a) velocity of flow
b) diameter of the sewer
c) Discharge
d) all the above.
463. The aggregate impact value of the aggregate used in
a) Building concrete is less than 45
b) Road pavement concrete is less than 30
c) Runway concrete is less than 30
d) All options are correct
463. The aggregate impact value of the aggregate used in
a) Building concrete is less than 45
b) Road pavement concrete is less than 30
c) Runway concrete is less than 30
d) **All options are correct**
464. If fineness modulus of sand is 2.5, it is graded as
a) Very fine sand
b) Fine sand
c) Medium sand
d) Course sand
464. If fineness modulus of sand is 2.5, it is graded as
a) Very fine sand
b) **Fine sand**
c) Medium sand
d) Course sand
465. The fineness modulus of fine aggregate is
a) 2 to 3.5
b) 3.5 to 5
c) 5 to 7
d) 6 to 8.5
465. The fineness modulus of fine aggregate is
a) 2 to 3.5
b) 3.5 to 5
c) 5 to 7
d) 6 to 8.5
466. LOS angeles machine is used to test the
a) Crushing Strength
b) Impact Value
c) Abrasion resistance
d) Water absorption
466. LOS angeles machine is used to test the
a) Crushing Strength
b) Impact Value
c) **Abrasion resistance**
d) Water absorption
467. Good Quality sand is never obtained from
a) River
b) Naala
c) Sea
d) Gravel powder
467. Good Quality sand is never obtained from
a) River
b) **Naala**
c) Sea
d) Gravel powder
468. Grading of sand causes great variation in
a) Workability of concrete
b) Strength of concrete
c) Durability of concrete
d) All of the above
468. Grading of sand causes great variation in
a) Workability of concrete
b) Strength of concrete
c) Durability of concrete
d) All of the above
469. Bulking of sand is
a) Less in fine sand
b) More in coarse sand
c) More in medium sand
d) More in fine sand
469. Bulking of sand is
a) Less in fine sand
b) More in coarse sand
c) More in medium sand
d) More in fine sand
For a given aggregate ratio, increasing the water cement ratio
a) Increases the strength
b) Decreases shrinkage
c) Increases shrinkage
d) Does not cause any change in shrinkage
470. For a given aggregate ratio, increasing the water cement ratio
a) Increases the strength
b) Decreases shrinkage
c) **Increases shrinkage**
d) Does not cause any change in shrinkage
An aggregate is known as Cyclopean aggregate if its size is more than
a) 75mm
b) 4.75mm
c) 30mm
d) 60mm
471. An aggregate is known as Cyclopean aggregate if its size is more than 
   a) 75mm
   b) 4.75mm
   c) 30mm
   d) 60mm
472. Bulking is 
   a) Increase in volume of sand due to moisture which keeps sand particles apart
   b) Increase in density of sand due to impurities like clay, organic matter, etc
   c) Ramming of sand so that it occupies minimum volume
   d) Compacting the sand
472. Bulking is

a) Increase in volume of sand due to moisture which keeps sand particles apart

b) Increase in density of sand due to impurities like clay, organic matter, etc

c) Ramming of sand so that it occupies minimum volume

d) Compacting the sand
473. Coarse sand has a fineness modulus in the range of
a) 2.2 to 2.4
b) 2.4 to 2.6
c) 2.6 to 2.9
d) 2.9 to 3.2
473. Coarse sand has a fineness modulus in the range of
a) 2.2 to 2.4
b) 2.4 to 2.6
c) 2.6 to 2.9
d) 2.9 to 3.2
474. The Resistance of an aggregate to the effect of hydration of cement and water is called
a) Impact value
b) Soundness
c) Crushing strength
d) Abrasion Resistance
474. The Resistance of an aggregate to the effect of hydration of cement and water is called

a) Impact value

b) **Soundness**

c) Crushing strength

d) Abrasion Resistance
475. The bulking of sand occurs due to
a) Air in voids
b) Moisture in voids
c) Surface tension
d) Capillary action
475. The bulking of sand occurs due to
a) Air in voids
b) **Moisture in voids**
c) Surface tension
d) Capillary action
476. The fineness modulus of an aggregate is roughly proportional to
a) Average size of particles in the aggregate
b) Grading of aggregate
c) Specific gravity of aggregate
d) Shape of aggregate
476. The fineness modulus of an aggregate is roughly proportional to

a) **Average size of particles in the aggregate**
b) Grading of aggregate
c) Specific gravity of aggregate
d) Shape of aggregate
477. The strength of concrete is mainly dependent on
a) Quality of fine aggregate
b) Water cement ratio
c) Fineness of cement
d) Quality of Course aggregate
477. The strength of concrete is mainly dependent on
a) Quality of fine aggregate
b) Water cement ratio
c) Fineness of cement
d) Quality of Course aggregate
478. The aggregate impact value of the aggregate used in
a) Building concrete is less than 45
b) Road pavement concrete is less than 30
c) Runway concrete is less than 30
d) All options are correct
478. The aggregate impact value of the aggregate used in
a) Building concrete is less than 45
b) Road pavement concrete is less than 30
c) Runway concrete is less than 30
d) **All options are correct**
479. The damp proof course is measured in:
   a) Length
   b) Area
   c) Volume
   d) Weight
479. The damp proof course is measured in:

a) Length
b) **Area**
c) Volume
d) Weight
480. The floor area included the area of the balcony upto:

a) 25%

b) 85%

c) 75%

d) 50%
480. The floor area included the area of the balcony upto:
   a) 25 %
   b) 85%
   c) 75%
   d) 50%
481. The quantity of wood for the shutters of doors and windows in calculated in:

a) m³
b) Lump-sum
c) m
d) m²
481. The quantity of wood for the shutters of doors and windows is calculated in:

a) $m^3$

b) Lump-sum

c) m

d) $m^2$
482. In straight line method, the annual depreciciation of the property is

\[ a) \frac{\text{Original Cost} - \text{annual sinking fund}}{\text{Life in year}} \]

\[ b) \frac{\text{Original Cost} + \text{Scrap Value}}{\text{Life in year}} \]

\[ c) \frac{\text{Original Cost} - \text{scrap value}}{\text{Life in year}} \]

\[ d) \frac{\text{Original Cost} + \text{scrap value}}{\text{Life in year}} \]
482. In straight line method, the annual depreciation of the property is

\[
a) \frac{\text{Original Cost} - \text{annual sinking fund}}{\text{Life in year}} \\
b) \frac{\text{Life in year}}{\text{Original Cost} + \text{Scrap Value}} \\
c) \frac{\text{Original Cost} - \text{scrap value}}{\text{Life in year}} \\
d) \frac{\text{Original Cost} + \text{scrap value}}{\text{Life in year}}
\]
483. The value of property during its useful life based on purchase value and depreciation etc. is known as:

a) Junk value
b) Salvage value
c) Scrap value
d) Book value
483. The value of property during its useful life based on purchase value and depreciation etc. is known as:

a) Junk value
b) Salvage value
c) Scrap value
d) Book value
484. The value of the property at the end of its useful life (without being dismantled) is known as:

a) Salvage value  
b) Scrap value  
c) Book value  
d) Junk value
484. The value of the property at the end of its useful life (without being dismantled) is known as:

a) **Salvage value**  
b) Scrap value  
c) Book value  
d) Junk value
485. The value of demolished material is known as
a) Scrap value
b) Salvage value
c) Resultant value
d) Material value
The value of demolished material is known as

a) **Scrap value**
b) Salvage value
c) Resultant value
d) Material value
486. Scrap value of a property may be ____.

a) Both negative or positive

b) Constant

c) Negative

d) Positive
486. Scrap value of a property may be____.
   a) Both negative or positive
   b) Constant
   c) Negative
   d) Positive
487. ____________is the technique of estimating or determining the fair price or value of a property such as a building, a factory, other engineering structures of various types.

a) depreciation
b) capital value
c) valuation
d) taxation
487. ____________is the technique of estimating or determining the fair price or value of a property such as a building, a factory, other engineering structures of various types.
   a) depreciation
   b) capital value
   c) valuation
   d) taxation
488. Most accurate method of estimation is based on:
   a) Building cost index estimate
   b) Point area estimate
   c) Detailed estimate
   d) Cube rate estimate
488. Most accurate method of estimation is based on:
   a) Building cost index estimate
   b) Point area estimate
   c) **Detailed estimate**
   d) Cube rate estimate
489. For building project estimate which method is generally used in PWD?

a) Long wall and short wall method
b) Center line method
c) Crossing method
d) Short wall method
489. For building project estimate which method is generally used in PWD?

a) Long wall and short wall method

b) **Center line method**

c) Crossing method

d) Short wall method
490. In the analysis of rates, the profit for the contractor is generally taken as
a) 20%
b) 15%
c) 10%
d) 5%
490. In the analysis of rates, the profit for the contractor is generally taken as:

a) 20%
b) 15%
c) 10%
d) 5%
491. In case of steel rolling shutters, for the estimation of painted area; the plain area is multiplied by
a) 0.75
b) 1.1
c) 1.25
d) 1.50
491. In case of steel rolling shutters, for the estimation of painted area; the plain area is multiplied by
a) 0.75
b) 1.1
c) 1.25
d) 1.50
492. The most reliable estimate is:
   a) Plinth area estimate
   b) Detailed estimate
   c) Preliminary estimate
   d) Cube rate estimate
492. The most reliable estimate is:

a) Plinth area estimate
b) **Detailed estimate**
c) Preliminary estimate
d) Cube rate estimate
493. Estimate for electrical wiring is prepared on the basis of
a) Voltage
b) Power
c) Number of appliances
d) Number of points
493. Estimate for electrical wiring is prepared on the basis of
a) Voltage
b) Power
c) Number of appliances
d) Number of points
494. An estimate is
a) Cost of the structure using thumb rules
b) Random guess of cost of structure
c) Probable cost arrived at before construction
d) Actual cost of construction.
494. An estimate is
a) Cost of the structure using thumb rules
b) Random guess of cost of structure
c) Probable cost arrived at before construction
d) Actual cost of construction.
495. The information which cannot be included in drawings is conveyed to the estimator through
a) Specifications
b) Cover note
c) Progress chart
d) None of these
495. The information which cannot be included in drawings is conveyed to the estimator through
a) **Specifications**
b) Cover note
c) Progress chart
d) None of these
496. Of the total estimated cost of a building, the cost of electrification usually accounts for
a) 1 %
b) 5%  
c) 8%  
d) 20 %
496. Of the total estimated cost of a building, the cost of electrification usually accounts for
a) 1%
b) 5%
c) 8%
d) 20%
497. The explosive for blasting is usually expressed in terms of
a) Explosive power
b) Volume of earthwork that can be blasted
c) Kilograms
d) None of these
497. The explosive for blasting is usually expressed in terms of
   a) Explosive power
   b) Volume of earthwork that can be blasted
   c) Kilograms
   d) None of these
498. Working out of exact quantities of various items of Work is known as
a) Estimation
b) Measurement
c) Quantity Surveying
d) Valuation
498. Working out of exact quantities of various items of Work is known as
a) Estimation
b) Measurement
c) **Quantity Surveying**
d) Valuation
499. Pick up the item of work not included in the plinth area estimate:

a) Wall thickness  
b) Room area  
c) Veranda area  
d) Courtyard area
499. Pick up the item of work not included in the plinth area estimate:
   a) Wall thickness
   b) Room area
   c) Veranda area
   d) Courtyard area
500. One brick thickness of wall is roughly equal to
a) 10 cm
b) 15 cm
c) 20 cm
d) 30 cm
500. One brick thickness of wall is roughly equal to
a) 10 cm
b) 15 cm
c) 20 cm
d) 30 cm
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