

Slab Design

- Q.1 The spacing of main bars in a slab should neither be more than three times the effective depth of the slab nor exceed
- (a) 300 mm (b) 450 mm
(c) 400 mm (d) 360 mm
- Q.2 Percentage of reinforcement in either direction of high strength deformed bars in slab shall not be less than
- (a) 0.15 (b) 0.16
(c) 0.12 (d) none of the above
- Q.3 Flat slab systems, designed by direct design method shall fulfil the following conditions:
1. There shall be minimum of three continuous spans in each direction.
 2. The design live load shall not exceed two times the design dead load.
 3. The panels shall be rectangular and the ratio of the longer span to the shorter span within a panel shall not exceed 2.0.
- Which of these statement/s is/are correct?
- (a) Both 1 and 2 (b) Both 2 and 3
(c) Both 1 and 3 (d) 1, 2 and 3
- Q.4 If the cross sectional areas of the three basic structural elements viz. beam, slab and column are related to the amount of steel reinforcement then which of the following statement is correct?
1. Percent steel is usually maximum in a column.
 2. Percent steel is least in a slab.
- (a) Only 1 (b) Only 2
(c) Both 1 and 2 (d) Neither 1 nor 2
- Q.5 In the design of flat slab, the absolute sum of the positive and average negative bending moments in each direction shall be taken as
- (a) $\frac{Wl_n}{8}$ (b) $\frac{Wl_n}{6}$
(c) $\frac{Wl_n}{4}$ (d) $\frac{Wl_n}{12}$
- Q.6 In the interior span of a flat slab system, the total design moment shall be distributed between negative design moment and positive design moment in the ratio of
- (a) 0.35 and 0.65 (b) 0.65 and 0.35
(c) 0.55 and 0.45 (d) 0.45 and 0.55
- Q.7 The radial moment at the centre of a simply supported circular slab carrying a uniformly distributed load is
- (a) $\frac{3}{16}wr^2$ (b) $\frac{2}{16}wr^2$
(c) $\frac{wr^2}{16}$ (d) $\frac{wr^2}{10}$
- Q.8 The radial moment at the boundary of a simply supported circular slab of radius R, subjected to a uniformly distribution load of w will be
- (a) $wR^2/8$ (b) $wR^2/12$
(c) $3wR^2/16$ (d) zero
- Q.9 A reinforced concrete slab is 75 mm thick. The maximum size of reinforcement bar that can be used is of
- (a) 12 mm diameter (b) 10 mm diameter
(c) 8 mm diameter (d) 6 mm diameter
- Q.10 The main reinforcement of a RC slab consists of 10 mm bars at 10 cm spacing. If it is desired to replace 10 mm bars by 12 mm bars, then the spacing of 12 mm bars should be
- (a) 12 cm (b) 14 cm
(c) 14.40 cm (d) 16 cm

Q.11 For a continuous slab of 3 m x 3.5 m size, the minimum overall depth of slab to satisfy vertical deflection limits is

- (a) 5 cm (b) 7.5 cm
(c) 10 cm (d) 12 cm

Q.12 If the size of panel in a flat slab is 6 m x 6 m, then as per Indian Standard Code, the widths of column strip and middle strip respectively are

- (a) 3.0 m and 1.5 m (b) 1.5 m and 3.0 m
(c) 3.0 m and 3.0 m (d) 1.5 m and 1.5 m

Q.13 A two way RCC slab is simply supported on all its edges with corners free to lift. The area of steel in the short span is 412 mm². The torsional reinforcement required at corner is

- (a) 309 mm² (b) 206 mm²
(c) 155 mm² (d) 247 mm²

Q.14 Consider a 'solid slab' having concrete of designed strength τ_c . The depth of the slab is 200 mm. The designed strength of slab for this depth is given as:

- (a) $1.1 \tau_c$ (b) $1.2 \tau_c$
(c) $1.3 \tau_c$ (d) $1.4 \tau_c$

Q.15 A solid slab is spanning in two directions at right angle and supported on beams. The load is uniformly distributed w kN/m². Assume l = length of slab, b = width of slab, the load carried by the beam along width of slab as per IS : 456;

- (a) $\frac{wt^2}{2}$ (b) $\frac{wt^2}{4}$
(c) $\frac{wt^2}{6}$ (d) $\frac{wt^2}{8}$

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Answers Slab Design

1. (a) 2. (c) 3. (c) 4. (c) 5. (a) 6. (b) 7. (a) 8. (d) 9. (c) 10. (c)
11. (c) 12. (b) 13. (a) 14. (b) 15. (b)

Explanations Slab Design

- (a)
According to clause 26.3.3 of IS 456 : 2000, the horizontal distance between the parallel main reinforcement bars shall not be more than three times the effective depth of solid slab or 300 mm whichever is smaller.
- (c)
According to clause 26.5.2.1 of IS 456 : 2000, the mild steel reinforcement in either direction in slabs shall not be less than 0.15% of total cross-sectional area. However, this value can be reduced to 0.12%, when high strength deformed bars are used.
- (c)
Design live load shall not exceed three times the design dead load.
- (c)
The diameter of the bars shall not exceed one eighth of the total thickness of the slab.
 \therefore Maximum size = $\frac{75}{8} = 9.375$ mm
So the diameter will be 8 mm.
- (c)
The horizontal distance between parallel main reinforcement bars shall not be more than three times the effective depth of solid slab or 300 mm whichever is smaller. The total reinforcement in the slab should remain same. By replacing 10 mm bars by 12 mm bars, the spacing will increase as
 $\left(\frac{d_2}{d_1}\right)^2 \times S_1 = \left(\frac{12}{10}\right)^2 \times 10 = 14.4$ cm