



**DBB-8194**

Seat No. \_\_\_\_\_

**B. Arch. (Sem. - VI) Examination**

**May / June - 2015**

**Structure - VI**

Time : 3 Hours]

[Total Marks : 120

- Instructions :**
- (1) Do not write anything other than your roll number on question paper.
  - (2) Use of IS:456-2000 and SP-16 is allowed during this paper for the design purpose.
  - (3) Assume suitable data wherever essential and mention it clearly.
  - (4) **Writing appropriate units, nomenclature, and drawing neat sketches/schematics wherever required is an integral part of the answer.**

1 (A) Choose appropriate option from the below 20

- (1) What is the yield strength of mild steel ?
  - (a) 250 MPa
  - (b) 375 MPa
  - (c) 415 MPa
  - (d) 500 MPa
- (2) As per IS:456 modulus of elasticity for M25 concrete should be
  - (a) 10000 MPa
  - (b) 25000 MPa
  - (c) 30000 MPa
  - (d) 27500 MPa
- (3) What is the minimum grade of concrete for reinforced concrete construction ?
  - (a) M 10
  - (b) M 15
  - (c) M 20
  - (d) M 25

- (4) Calculation of imposed loads is done as per which Indian Standard Code ?
- (a) IS:800                      (b) IS:875 (part-2)  
(c) IS:456                      (d) IS:875 (part-3)
- (5) For a cantilever beam with span 7 m what should be the minimum depth as per IS:456
- (a) 500 mm                      (b) 700 mm  
(c) 800 mm                      (d) 1000 mm
- (6) What should be the nominal cover for moderate exposure of concrete ?
- (a) 20 mm                      (b) 25 mm  
(c) 30 mm                      (d) 35 mm
- (7) The maximum compressive strain in concrete in axial compression is taken as,
- (a) 0.002                      (b) 0.0002  
(c) 0.001                      (d) 0.0001
- (8) For a beam size 300 mm × 500 mm, what should be the minimum area of reinforcement to be provided if the grade of steel is Fe415 ?
- (a) 150 mm<sup>2</sup>                      (b) 200 mm<sup>2</sup>  
(c) 225 mm<sup>2</sup>                      (d) 250 mm<sup>2</sup>
- (9) Minimum number of bars to be provided in a circular column should be
- (a) 4                              (b) 5  
(c) 6                              (d) 8
- (10) For slabs the horizontal distance between parallel main reinforcement bars shall not be more than
- (a) 150 mm                      (b) 200 mm  
(c) 250 mm                      (d) 300 mm

- 2 (A) What are the assumptions made for the limit state of design ? 6
- (B) Define any two. 8
- (a) Characteristic strength
- (b) Effective depth
- (c) Design load
- (C) Enlist factor influencing the durability of concrete. 6
- 3 (A) Design a singly reinforced beam with design moment 150 kN.m and Shear Force 100 kN. The size of beam is 230 mm × 450 mm. effective cover is 35 mm, use M20 concrete and Fe415 steel. Draw neat sketch. 15
- (B) Differentiate between singly and doubly reinforced beam design. 5
- 4 (A) Enlist the various reinforcement requirements for beam, column and slab as per IS:456. 8
- (B) Design a slab of size 3m × 6m with thickness 135 mm and having a live load of 2.5 kN/m<sup>2</sup> the load of floor finish is 1 kN/m<sup>2</sup>. using M25 and Fe415. Clear cover to main reinforcement is 15 mm. 12
- 5 (A) Design a circular column of 400 mm diameter with helical reinforcement subjected to an axial load of 1500 kN under service load and live load. The column has an unsupported length of 3 m effectively held in position at both ends but not restrained against rotation. Use M25 concrete and Fe415 steel. 20

OR

- 5 (B) Calculate working axial load of a column of size **20**  
230 mm × 450 mm reinforced with 6-12 mm dia. bars. Use  
M25 concrete and Fe415 steel. Clear cover to main  
reinforcement is 40 mm.
- 6 (A) Enlist and explain with neat sketch various types of **6**  
shallow foudation.
- (B) Design a plain concrete footing for a column of **14**  
400 mm × 400 mm carrying an axial load of 600 kN  
under service loads. Assume safe bearing capacity of soil  
as 350 kN/m<sup>2</sup> at a depth of 2 m below the ground level.  
Use M20 concrete and Fe415 steel for the design.
-