

S.No. : 341

AR 1603

No. of Printed Pages : 04

Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 10134

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B. Arch. Examination 2021-22

(Even Semester)

ARCHITECTURAL STRUCTURE - VI

Time : Three Hours]

[Maximum Marks : 60

- Note :-**
- (i) Use of IS : 456 : 200 is allowed.
 - (ii) Use of IS : 800 : 2007 is allowed.
 - (iii) Use of non-programmable scientific calculator and steel tables is allowed.
 - (iv) Assume any data missing, if any suitably.

SECTION - A

1. Attempt all parts of the following : 8×1=8
- (a) Explain the types of retaining walls.
 - (b) What is shear lag?

[P. T. O.]

- (c) Explain pressure distribution under footing with figure.
- (d) Define pitch of trusses.
- (e) What are the forces acting on a retaining wall?
- (f) Define effective length of compression members.
- (g) Why dowel bars are provided in footing?
- (h) Distinguish between laterally restrained and unrestrained beams.

SECTION – B

2. Attempt any three parts of the following : $4 \times 3 = 12$

- (a) What are the stability requirements for retaining wall?
- (b) Explain in detail, the steps involved in the design of compression members.
- (c) What are the points should be considered while fixing the depth of footing? Explain each point in detail.

- (d) With a neat sketch, show the various components in a steel roof truss.

SECTION - C

Note :- Attempt any two questions in this section.
5×8=40

3. (a) Design a lap joint between the two plates of width 150 mm, if the thickness of one plate is 12 mm and the other is 10 mm. The joint has to transfer a working load of 100 kN. The plate are of Fe 410 grade. use bearing type bolts.
- (b) Design a cantilever retaining wall to retain 5m of horizontal backfill. The density of soil is 17 kN/m³. Safe bearing capacity of soil is 165 kN/m². Angle of internal friction = 25°. The coefficient of friction between the base slab and concrete is 0.55. Factor of safety against sliding and overturning is 1.45. Use M 20 concrete and Fe 415 steel.
4. (a) A tension member in a roof truss is subjected to factored tensile load of 300 kN. Design the member using two angle on both side of gusset plate. Assume $f_y = 250$ MPa and 20 mm diameter bolts.

[P. T. O.]

- (b) Explain different types of raft foundations, with neat sketches.
5. (a) Design a simply supported beam of 5m span, carrying a working load of dead load of 20 kN/m and imposed load of 15 kN/m. Assume that the compression flange of the beam is laterally restrained throughout.
- (b) A solid footing has to transfer a dead load of 1000 kN and imposed load of 400 kN from a square column 400×400 mm with 16 mm diameter reinforcement. Assume Fe 415 grade of steel and M 20 grade of concrete. Safe bearing capacity of soil is 200 kN/m^3 . Design the footing and show the reinforcement details.

