

S.No. : 340

AR 1403

No. of Printed Pages : 04

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

PAPER ID : 10122

Roll
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B. Arch. Examination 2021-22

(Even Semester)

ARCHITECTURAL STRUCTURE - IV

Time : Three Hours]

[Maximum Marks : 60

- Note :-**
- (i) Use of IS : 456 : 2000 is allowed.
 - (ii) Use of non-programmable scientific calculator is allowed.
 - (iii) Assume missing data if any suitably.

SECTION - A

1. Attempt all parts of the following : $8 \times 1 = 8$
 - (a) Define modular ratio.
 - (b) Explain how bending shear stress procedure tension crack in concrete?

[P. T. O.

- (c) Explain limiting moment of resistance.
- (d) Explain the need for corner reinforcement in two-way slabs whose corners are prevented from lifting-up.
- (e) Define development length.
- (f) Explain characteristic strength.
- (g) Explain neutral axis.
- (h) Classify sand, silt and clay based on their size as per India standards.

SECTION – B

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

- (a) What are the assumptions made in working stress method?
- (b) What is the difference between singly reinforced beam and doubly reinforced beam?
- (c) What do you understand by nominal shear stress? Give the reason for providing minimum shear reinforcement.
- (d) Give a neat sketch for the reinforcement details for a two-way continuous slabs.

SECTION – C

Note :– Attempt any two questions. 2×20=40

3. (a) What are the merits and demerits of working stress method.
- (b) A singly reinforced beam 250 mm wide and 400 mm deep (effective) is reinforced with 4 nos. - 16 ϕ diameter. Find the depth of neutral axis, limiting depth of neutral axis and specify the type of beam. use M 20 grade of concrete and Fe 415 grade of steel.
4. (a) A simply supported RCC beam 250 mm \times 500 mm effective depth and is reinforced with 4 nos. - 20 ϕ diameter, as tension reinforcement. If the beam is subjected to a factored shear of 65 kN, at the support. Find nominal shear stress at the support and design shear reinforcement. Use M 20 grade of concrete and Fe 415 grade of steel.
- (b) One cubic metre of wet soil weighs 19.80 kN. If the specific gravity of soil particles is 2.70 and water content is 11%. Find the void ratio, dry density and degree of saturation.

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5. (a) Design a rectangular beam $250 \text{ mm} \times 500 \text{ mm}$ effective depth is subjected to a factored moment of 160 kNm . Find the reinforcement requirement. Use M 20 grade of concrete and Fe 415 grade of steel.
- (b) Design a RCC slab for a room having inside dimension $3 \text{ m} \times 7 \text{ m}$. The thickness of supporting wall is 300 mm . The slab carries 75 mm thick lime concrete at its top. The unit weight of which may be taken as 20 kN/m^3 . The live load on the slab may be taken as 3 kN/m^2 . Assume slab is simply supported at the ends. Use M 20 concrete and Fe 415 steel.
