

2032

B. Arch. EXAMINATION, 2020

(Fourth Semester)

(Re-appear Only)

STRUCTURAL DESIGN-IV

AR206G

Time : 3 Hours]

[Maximum Marks : 50

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks. Assume, if any missing data.

Unit I

1. Explain the various types of shear stress used. **10**
2. A reinforced concrete beam 250 mm wide and 400 mm effective depth is subjected to ultimate design shear force of 150 kN at the critical section near supports. The tensile reinforcement at the section near supports is 0.5%. Design the shear stirrups near the supports. Also, design the minimum shear reinforcement at the mid span. Assume concrete of grade M 20 and steel bars of Fe 250 grade. **10**

Unit II

3. What is Lintel ? Discuss all categories of lintel with the help of neat sketches. **10**

4. Determine the reinforcement required for a rectangular beam section with the following data :

Width of Section = 300 mm, Depth of Section = 500 mm, Factored B.M. = 80 kNm, Factored torsional moment = 40 kNm, Factored shear force = 70 kN, use M 15 grade concrete and Fe 415 grade steel. **10**

Unit III

5. Design a simply supported slab over a classroom of size 4 m× 9 m. The slab is subjected to a live load of 4 kN/m² and a surface finish of 1 kN/m². Assume M 20 concrete and Fe 415 steel. The exposure of steel is mild and there is no chance of fire. **10**
6. (a) What are the general features of two-way slab ? **5**
(b) Do comparison between one-way slab and two-way slab ? **5**

Unit IV

7. (a) Explain the four important dimensions of T-beam with their design criteria. **5**
(b) Write the design steps for isolated L-beam. **5**
8. Calculate the ultimate moment of resistance of a T-Beam having effective depth and width of web as 580 mm and 320 mm respectively. The flange width and thickness of flange are 1200 mm and 150 mm respectively. The T-beam is reinforced with 4000 mm². Fe 415 steel of tension side. M 20 grade of concrete has been used. **10**