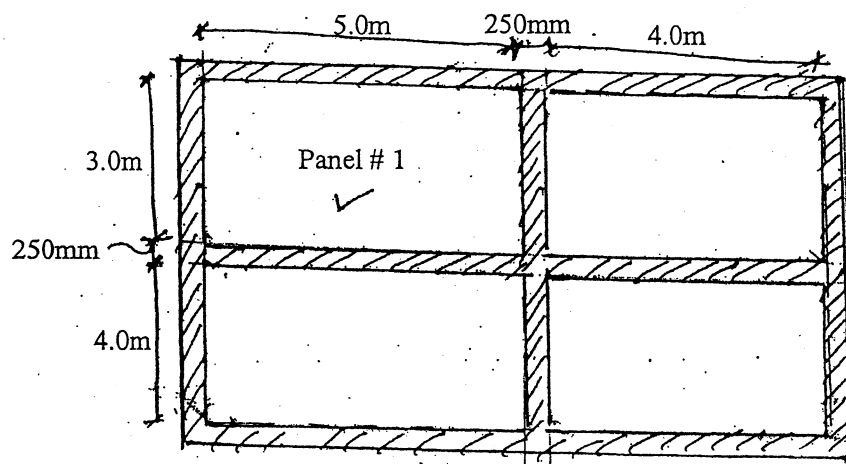


Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BCE	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

**Subject: - Design of Reinforced Concrete Structures..**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any **Four** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Use of IS: 456, IS 1343 are allowed. IS 456 SP-16 is allowed to design column only.
- ✓ Assume suitable data if necessary.

1. a) What is the difference between working stress method and limit state method? Explain with stress and strain diagrams. [5]
- b) Design a simply supported rectangular beam with the effective span of 7m. The size of beam is required to be limited to 300mm × 700mm. Design shear reinforcement also. Take a live load of 70 kN/m. Use M20 concrete and Fe415 grade steel. [15]
2. The floor slab system of a two-storeyed building is shown in figure. The slab system is supported on 250mm wide beam as shown. Assuming a floor finish load of 1 kN/m<sup>2</sup> and a live load of 4 kN/m<sup>2</sup>, design and detail the slab panel # 1 as indicated in the floor plan. Also check whether the section satisfies the deflection criteria. (Check for shear and development length not required). The torsional reinforcement should be designed. Use Fe415 steel. Assume mild exposure conditions. [12+4+4]



\* The clear size of panel # 1 is 3.0m × 5.0m as shown.

\* Width of beam = 250mm

3. a) Explain the concept of design of a staircase. Show the detailing of reinforcement of straight flight in plan and section. [5]
- b) Determine the reinforcement equal in all sides of a biaxially loaded column with the following parameters. [15]
 

Size of column = 400mm × 500mm  
 Factored load,  $P_u = 1200$  kN,  
 Factored moment  $M_{ux} = 120$  kNm,  
 Factored moment  $M_{uy} = 100$  kNm.  
 M20 concrete and Fe 415 steel.  
 $d'/D = 0.15$  for both axes.
4. a) Explain how an RC structural member subjected to torsion, shear force and bending moment is designed by IS code method. [6]