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Total Number of Pages : 02

B.Tech
PCCI4301

5th Semester Back Examination 2019-20
DESIGN OF CONCRETE STRUCTURES

BRANCH : CIVIL

Time : 3 Hours

Max Marks : 70

Q.CODE : HB485

Answer Question No.1 which is compulsory and any FIVE from the rest.
The figures in the right hand margin indicate marks.

- Q1 Answer the following questions : (2 x 10)**
- a) Draw idealized stress-strain curve of Fe415 steel.
 - b) List various types of loads acting on a structure as per IS456.
 - c) State relationship between characteristic compressive strength and flexural strength as per IS456.
 - d) Write partial safety factor of steel and concrete in the limit state of collapse as per IS456.
 - e) Write Rankine's formula for minimum depth of foundation.
 - f) State difference between one way slab and two way slab.
 - g) What is the minimum eccentricity to be considered in design of column as per IS 456?
 - h) Define stress block.
 - i) Define anchorage length.
 - j) What is minimum cover to be provided to slab?
- Q2 a) Write steps for designing of combined column footings. (5)**
b) A rectangular beam of 200mm wide and 450mm deep is reinforced with (5)
4 numbers of 20mm diameter bar with an effective cover of 50 mm. Effective span of the beam is 6m. Determine the central concentrated load P that can be carried in addition to self-weight. Use M20 concrete and Fe415 steel.
- Q3 a) Column of a multistory building is reinforced with 25mm diameter Fe415 bars. (5)**
Calculate the lap length required and sketch the details. Use M20 concrete.
b) Write the difference between the design philosophy of limit state and working (5)
state method.
- Q4 a) A column of 3m high is subjected the following loads: (5)**
Total dead load= 30 kN, Total Imposed load= 80 kN, wind load 4kN/m height
Determine the design loads for the limit of collapse and serviceability.
b) A one way slab has effective span of 3.6m and is 150mm thick. The live load (5)
expected on it is 3 kN/m². Determine the design moment, design shear and loads for checking serviceability.
- Q5 a) Calculate loads acting on dog legged stairs for an office building in a room (5)**
measuring 2.8m×5.8m clear dimension. Vertical distance between floors is 3.6m. Width of the flight is to be 1.25m. Allow a live load of 3 kN/m². Sketch the details of reinforcements. Use M20 concrete and Fe415 steel.
b) Write the assumptions made in limit state of collapse for designing columns as (5)
per IS456.

- Q6** A rectangular beam of 200mm wide and 350mm deep up to the center of the reinforcement has to resist a factored moment of 40 kN-m. Design the section. Use M20 concrete and fe415 grade steel. **(10)**
- Q7** A hall has clear dimension 3m×9m, with wall thickness 230mm. The live load on the slab is 3kN/m² and a finishing load of 1 Kn/m² may be assumed. Use M20 concrete and fe415 grade steel. Deign the slab. **(10)**
- Q8** **Write short Notes on any TWO :** **(5 x 2)**
- a) Design of doubly reinforced beams
 - b) Limit state of serviceability
 - c) Long columns