Seat No:_____ **Enrolment No:_____**

PARUL UNIVERSITY

FACULTY OF ARCHITECTURE

B. Arch. Winter 2019- 20 Examination

Semester: 6 **Date: 21/11/2019**
Subject Code: 01101356 **Time: 2:00 pm to 4:00 pm**
Subject Name: Structural Design & Analysis - IV **Total Marks: 50**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions whenever required.
4. Draw suitable sketches whenever required.

Q.1 Draw detail of reinforcement in staircase from the following data for one flight. **(10)**
(i) Landing width = 1.5 m, Riser =150 mm, Tread = 300 mm
(ii) Waist slab overall thickness = 150 mm.
(iii) Main steel = 12 mm dia. at 125 mm c/c.
(iv) Distribution steel = 8 mm dia. bars at 175 mm c/c.
(v) Effective cover = 25 mm.
(vi) Assume landings on both the sides and no. of steps 10

Q.2 **Attempt any five out of the following six.** **(20)**

1) Draw one-way slab and two-way slab load distribution

2) Write Difference for Balanced sections, Under reinforced section, Over reinforced section with moment of resilience.

3) State the different forms of limit state of serviceability.

4) Explain M20 grade of concrete.

5) Differentiate between behavior of long column and short column with neat sketches.

6) Explain the various type of footing with neat sketch.

Q.3 **Explain the following in brief. (Any five)** **(10)**

1. Define characteristic strength
2. What is meaning of heavy concrete.
3. Define depth of natural axis for rectangular RCC Beam.
4. Explain role stirrups in column.
5. Calculate percentage of steel for column having gross area of 600mm diameter.
6. Use of reinforcement bars in plinth beam.

Q.4 **Answer any two out the following three.** **(10)**

1) Design and draw sketch for a Rectangular isolated footing with uniform thickness for axial load of 1700 kN. Assume self-weight of footing 10% of axial Load. SBC of soil is 200 KN/m^2. Take M20 and Fe 415 grade of material. Take column size 300mm x 600mm. and draw neat sketch with detailing of reinforcement

2) Design a rectangular beam having size of 300mm x 600mm as per IS 456. The Beam is simply supported for span of 5.5, limiting moment is 140 KNm. Take M20 and Fe 415

3) Design a short R.C. column to resist an axial characteristic load of 1350 KN. Use material M20, Fe 415. Draw neat sketch. Take 2.5% area of steel.