

**PARUL UNIVERSITY**  
**FACULTY OF ARCHITECTURE AND PLANNING**  
**B.Arch. Winter 2018-19 Examination**

Semester: 4

Subject Code: 01101256

Subject Name: Structural Design and Analysis-II

Date: 29/11/2018

Time: 2:00pm to 4:00 pm

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 Define following :** 1. Stress, 2. Strain, 3. Hooke's law, 4. Bulk modulus, 5. Volumetric strain, 6. Principle of superposition, 7. Poisson's ratio, 8. Modular ratio, 9. Shear force, 10. Bending moment. (10)

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

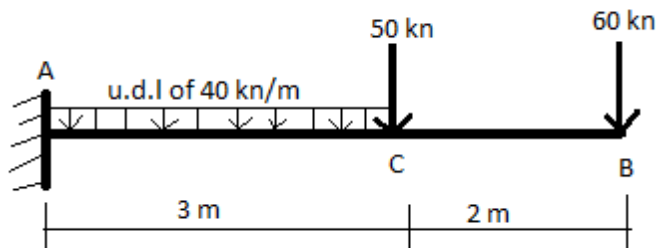
1) Write difference between following (any two)

1. Super structure and substructure.
2. Young's modulus and bulk modulus.
3. Longitudinal strain and direct strain.

2) A circular rod of dia. 25mm and 800 mm long is subjected to tensile force 75kN. the modulus of elasticity for steel may be taken as 250 kN/mm<sup>2</sup>. Find stress, strain and elongation of the bar due to applied load.

3) A reinforced concrete circular column of 400 mm diameter has 6 steel bars of 20 mm diameter embedded in it. Find the maximum load which the column can carry, when value of  $E_s = 210$  GPA and  $E_c = 130$  GPA

4) Draw shear force diagram for a cantilever beam. For fig.1



5) Draw bending moment diagram for a cantilever beam. For fig 1.

6) Derive the expression of principle of superposition for composite section

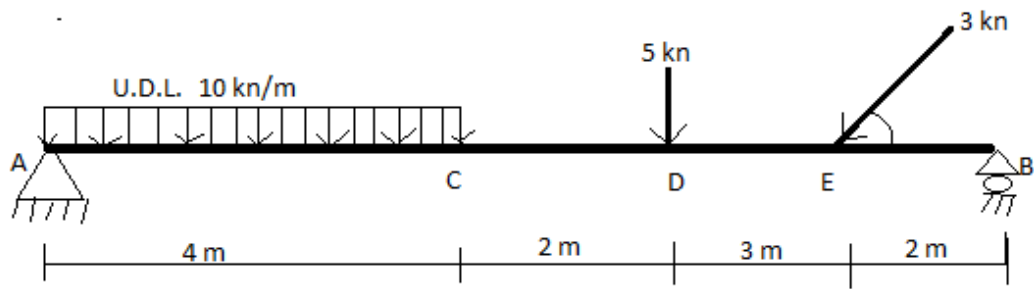
**Q.3 Explain the term: (Any 5)** (10)

1. Explain the term point of contracture.
2. Explain the different type of beam, support and loads in detail.
3. Explain advantages and disadvantages of determinate structure.
4. Draw stress- strain curve for mild steel and explain the important point.
5. The material goes under considerable deformation with rupture is called \_\_\_\_\_.
6. Equilibrium of body

**Q.4 Attempt any two out of three** (10)

1) A steel rod of 150mm dia. is inserted in to a copper tube of 250mm external diameter and 200mm internal diameter. The composite section is subjected to axial tensile force 120 kN the length of the section is 500mm. when value of  $E_s = 210$  GPA and  $E_c = 130$  GPA

- 2) Solve for shear force and draw the shear force diagram for fig 3. The inscribed angle at point of 'E' load is marked to be  $45^\circ$ .



- 3) Solve for bending moment and draw the bending moment diagram fig 3.