**BSC10**

**Fourth Semester B. Tech Civil Engineering**

**Examination Aug/Sep-2015**

**Solid Mechanics**

**Time:-3Hours Max. Marks: - 75**

**SECTION-A**

**Answer any five questions. (5\*5)**

1. What is Stress? Write an introductory note on Analysis of Stress.
2. Define the Complementary Shear stress.
3. A body is subjected to two normal strains of magnitude εx= 0.001 and εy=0.002. Determine the normal and shearing strains on a plane inclined at 30o with the εx strain.
4. What do you mean by strain components?
5. Define the following:
6. Poisson’s Ratio
7. Modulus of elasticity
8. The normal strains at a point in a Material are εx = 15 x 10-3, εy= 10 x 10-3.Determine the normal and shearing strains on a plane inclined at 200 with εx strain by drawing Mohr’s Circle.
9. A cylindrical bar is 2 cm in diameter and 100 cm long. During a tensile test it is found that the longitudinal strain is 4 times the lateral strain. Calculate the modulus of rigidity and the bulk modulus if its elastic modulus is 100 GPa. Find the change in volume, when the bar is subjected to a hydrostatic pressure of 100 MPa.

**SECTION-B**

**Answer any two questions.**   **(10\*2)**

1. Explain Strain on an Oblique plane.
2. A Piece of material 15 cm long by 2.5 cm square is in compression under a load 100 KN. If the modulus of elasticity of the material s 105 GPa and Poisson’s ratio is 0.25, find the alteration in length if all lateral strain is prevented by the application of uniform lateral external pressure of suitable intensity.
3. A steel plate is subjected to tensile stresses of 200MPa and 150 MPa at right angles to each other. Determine the normal and tangential stresses on a plane inclined at 60 to the 200 MPa stress. Also find the plane on which the resultant stress has maximum Obliquity.

**SECTION-C**

**Answer any two questions. (15\*2)**

1. What is sign convention? Draw and discuss in detail the Mohr’s Circle for Biaxial stresses.
2. Elaborate the concept of three dimensional stresses.
3. AB and CD are two planes inclined to one another at 70o. On the plane AB there is a Compressive stress of 40 MN/m2 and a shearing stress of 20 MN/ m2 .While on CD there is a tensile stress of 10 MN/ m2 and a shearing stress. Using Mohr’s stress circle method or otherwise, determines the value of the shearing stress, the principle stress and the position of the principle planes. For Mohr’s circle, take the following scale: 1 cm = 10 MN/ m2.