**Registration no:** | | | | | | | | | | |

**Total Number of Pages: 1** **M.TECH**
**CEPC1**

# 1stSemester Regular/BackExamination – 2015-16
# Theory of Elasticity and Plasticity

(STRUCTURAL ENGINEERING)
Q.CODE-T1081

Time 3 hrs
FM – 70

Answer any six questions including question No. 1

Q1. Explain the following very shortly.
- i. Modulus of rigidity
- ii. Shear centre
- iii. Elastoplastic section
- iv. St Venant's principle
- v. Plastic section modulus
- vi. Virtual work principle
- vii. Stress function
- viii. Web buckling
- ix. Compact section
- x. Toughness

Q2. Derive the relations for stress and strain for a three dimensional isotropic and homogeneous solid.

Q3. Derive the horizontal and vertical components of deflection of a cantilever beam loaded with a point load at the end.

Q4. What are conditions of compatibility? Derive the conditions for compatibility for a plane stress problem.

Q5. Derive the relation for shear stress for a narrow channel section of depth d and flange width $b_f$ and thickness t subjected to a twisting moment.

Q6. Derive the relation of compatibility for an axisymmetric solid in polar co ordinates with usual notations.

Q7. What is anupper bound problem? Compute the collapse load per unit length for a single storey single bay portal frame of 4 m height and 3 m span with a uniformly distributed load. All the members have uniform flexural rigidity and both the columns are fixed at the base.

Q8. What is shape factor? Determine the shape factor for a trapezoidal section of base width $b_1$, top width $b_2$ and height h.