

Total Pages—3

(Set-1)

**M.Tech -2nd(SE)**  
**Civil Engineering Materials**

Full Marks : 70

Time : 3 hours

Answer any **six** questions including Q. No. 1

*The figures in the right-hand margin indicate marks*

1. Explain the following shortly : 2 × 10
- (i) No fines concrete
  - (ii) Fineness of cement
  - (iii) Soundness of cement
  - (iv) Bleeding of concrete
  - (v) Workability of concrete
  - (vi) Air entrained concrete
  - (vii) Secant modulus and tangent modulus of concrete

( Turn Over )

( 2 )

(viii) Proof stress

(ix) Endurance limit

(x) Plastic hinge.

2. What are the major chemical compounds of ordinary Portland cement? Explain the hydration of cement based on these compounds. 10
3. What is carbonation and what are its effects? Explain some important factors those influence carbonation. 10
4. Explain the role of water cement ratio and aggregate cement ratio on the compressive strength of concrete. 10
5. Explain the factors those affect the permeability and durability of cement concrete. 10
6. What is fatigue of metals? Explain the influence of stress concentration on fatigue. 10

( 3 )

7. Explain the effect of temperature on yield point and ultimate strength of mild steel under tension. 10
8. A large spherical tank of inner diameter of 16 m contains gas at a pressure of 3.0 MPa. Determine the required thickness of the container if the yield stress of the material is 490 MPa and Poisson's ratio of 0.3 for a factor of safety of 2.5. Use maximum principal stress theory and maximum shear stress theory. 10

