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Total No. of Questions : 08

M.Tech. (Structural Design) (Sem.-1)
MATERIAL TECHNOLOGY
Subject Code : MTSD-101
M.Code : 74242
Date of Examination : 14-01-23

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :
1. **Attempt any FIVE questions out of EIGHT questions.**
2. **Each question carries TWENTY marks.**

1. a) Discuss the principal constituents of cement and their role in the process of hardening of cement paste.

   b) Draw probable (typical) graphs to show

   i) Relation between water / cement ratio and degree of hydration at which capillaries cease to be continuous.

   ii) Compressive strength and specific surface at different ages of cement.

2. a) Discuss different formulae (empirical) to show relation between compressive and tensile strength of concrete.

   b) 'Concrete is generally well resistant to chemical attack, provided an appropriate mix is used and concrete is properly compacted.' There are however, some exceptions. Discuss in detail those exceptions.

3. a) Discuss three types of Air entraining agents.

   b) Show the normal stress distribution near ends of specimens when tested in a machine with (i) Hard platens (ii) Soft platens.

4. a) Give step by step procedure of Mix Design.

   b) Discuss in brief about '*Deformation of Crystals*'.

5. a) Discuss the role of statistical methods in controlling the quality of concrete.

   b) Discuss common correct and incorrect practices prevalent regarding concrete construction at site.

6. a) Define Endurance Limit & its impotance.

   b) Show '*Modified Goodman Diagrams*' for concrete in compression and flexure fatigue.

7. a) Define Thermal conductivity.

   b) Discuss Creep-Stress-Time-Temperature relations for simple tension.

8. **Write short notes on :**

   a) Rapid Hardening Portland cement

   b) Yield surfaces.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.