8. Write short notes on : $5 \times 4 = 20$

(i) Hydration mechanism.

(ii) Properties of ceramics.

(iii) Effect of alloying elemer steel.

(iv) Crystal planes and direc





*Roll No.* .....

# 23397

## M. Tech. 1st Sem. Civil Engg.
## (Specialization in Structural Design)
## Examination – January, 2016

**MATERIAL SCIENCE**

**Paper : MTSD-110**

*Time : Three Hours ]* *[ Maximum Marks : 100*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note :* Attempt any *five* questions. All questions carry equal marks. Assume any missing data, if required.

1. Differentiate between : $10 + 5 + 5 = 20$

(a) Steady-state and Non-steady state diffusion.

(b) Phase and a micro constituent.

(c) Atomic structure and crystal structure.

**2.** (a) Calculate the theoretical ty of diamond given that C-C distance an l angle are 0.154 mm and 109.5° resp. Com with measured density. 10

(b) Calculate the composition m percent of an alloy that consists of 97 wt % nium and 3 wt % copper. 10

**3.** (a) Briefly describe diffusion n sm of solid and its application. 10

(b) Briefly describe Hume Ro rule for alloys system. 10

**4.** (a) Write a short note on prop of silicate glass. Draw its structure also. 10

(b) Derive expression for th ive amount of phases present at equilibriu g lever rule. 10





**5.** What do you mean by reinforced glass ? A continuous and aligned glass fibre reinforced composite consist of 41 Vol% of glass fibre having a modulus of elasticity of 65 GPa and 60 Vol % of polyester resin displays a modulus of 3.0 GPa. Calculate the modulus of Elasticity of this composite in longitudinal direction. If the cross sectional area is 250 $mm^2$ and stress applied in 52 MPa in longitudinal direction. Calculate load caused by each of the fibre and matrix phase. 20

**6.** (a) Describe the conditions under which collusion occurs. What are the measures that may be taken to present or control collusion ? 10

(b) Briefly describe the phenomena of super heating and super cooling. 10

**7.** (a) What do you mean by composite materials ? Explain its types also. 10

(b) Write a short note on applications of composite materials. 10