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SF-6561

B. E. II (Sem - IV) (Mech.) Examination

May / June – 2011

Material Science & Metallurgy

Time : Hours] [Total Marks :

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. II (Sem - IV) (Mech.)**

Name of the Subject :

☛ **Material Science & Metallurgy**

☛ Subject Code No. : **6 5 6 1** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) Attempt all questions.

(3) Figure to the right indicate full marks.

(4) Draw neat sketch whenever necessary.

1 Attempt any four from following : **20**

(a) Define the following terms :

(i) Thermal stresses.

(ii) Creep.

(iii) Melting point

(iv) Toughness.

(v) Elasticity.

(b) What is fracture ? Explain any one type of fracture.

(c) Give the classification of ceramicmaterials.

(d) Explain Frenkel and Schottky defects.

(e) Write short note on polymerization.

2 Answer the following :

(a) Differentiate any three from following : **09**

(1) Upper and lower yield points.

(2) Endurance limit and fatigue limit.

(3) True and engineering stresses.

(4) Addition polymerization and condensation polymerization.

(b) Define Bragg's law and derive its formula with sketch. **06**

3 Attempt any three of the following : **15**

(1) Derive the value of atomic paching factor for FCC structure with necessary sketch.

(2) Explain co-ordination numbers.

(3) Explain electrical resistance and various factor affecting the electrical resistance of materials.

(4) Explain point defacts.

4 (a) Answer any five. **10**

(1) What is an Austenite ?

(2) What is phase.

(3) What is sintering process ?

(4) What are different steel manufacturing processes?

(5) What is the effect of following alloying element on alloy steel

Nickel, Chromium, Copper, Cobalt

(6) Suggest suitable material for :

Gears, Connecting rod, Condenser, Railway track

(7) What is the difference betwen Hardening and Hardenbility ?

(b) Draw and explain Iron-Iron carbide equilibrium diagram. **10**

5 Answer the following : (Any three) **15**

(1) Explain any one method for steel manufacturing with a neat sketch.

(2) List merits & demerits of "powder metallurgy process".

(3) Explain "Jominey Hardenbility test".

(4) What is the effect of carbon content on plain carbon steel & phases present ?

6 (a) Draw T-T-T diagram for 0.8% carbon steel and explain its importance to the heat treatment processes give to the steel. **06**

OR

(a) What is Case-Hardening process ? explain "Pack carburising process". **06**

(b) Answer the following. (Any three) **09**

(1) Explain "Spheroids Annealing"

(2) What is the difference between white cast iron & Grey cast iron ?

(3) Give composition & use of "Gun metal".

(4) Explain; Paratactic, monotectic, Eutectic System.