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UF-8121

B. E. II (Sem. III) (Mechanical) Examination

May/June – 2012

Material Science & Metallurgy

(New Course)

Time : **3** Hours] [Total Marks : **100**

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. III) (Mechanical)**

Name of the Subject :

☛ **Material Science & Metallurgy (New Course)**

☛ Subject Code No. : **8 1 2 1** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) Attempt all questions.
(3) Use of calculator is permitted.
(4) Figures to right indicate full marks.
(5) Assume suitable data if required.

1 (a) Explain following terms. **6**

(1) Toughness (2) Hardness
(3) Hardenability (4) Malleability
(5) Creep (6) Elasticity

(b) State the importance of study of materials science and briefly. Explain engineering requirements of materials. **7**

(c) Explain selection criteria for engineering materials. **7**

OR

(c) Evaluate : "After etching the microspecimen structure is visible". Write a short note on "Macro-examination". **7**

2 (a) What is Gibbs' phase rule ? Define system phase and degree of freedom so that the degree of freedom eutectic point in a binary phase diagram is zero. **10**

OR

(a) Draw an iron-iron carbide equilibrium diagram for 0.8% carbon steel and state critical reactions of iron carbon phase diagram. **10**

(b) What is coring ? Why it is observed ? **5**

3 (a) What are the purposes of alloying ? Give effects of nickel as an alloying element. **10**

(b) Give composition, properties and uses of malleable cast iron. **5**

OR

3 (a) Define "Alloy". Also state composition, properties & uses of any two copper alloys. **10**

(b) What is "Wrought iron" ? Enlist the properties. **5**

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

(1) What is tempering process ? Give its objectives.

(2) Define : Bornze. Give it chemical composition.

(3) What is compacting process ?

(4) Give any four applications of cast-iron.

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

Nickel, Chromium, Copper, Silicon.

(6) Suggest suitable material for :

Gears, Connecting rod, Condenser, Milling cutters.

(7) What is the difference between surface hardening & case hardening ?

(b) Explain different methods for prevention of corrosion in detail. **10**

5 Answer the following. (any three) **18**

(1) Explain : Radiography testing method with labelled sketch.

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

(3) Write down short note on : Normalizing process.

(4) Explian : Copper alloys with its chemical composition, properties, application.

6 (a) What is case-hardening process ? Explain "Gas-carburizing process". **6**

(b) Answer the following. (any two) **6**

(1) Give difference between : Cast-iron & Steel.

(2) What is corrosion ? Explain "Wet corrosion".

(3) Write down short note on : Liquid carburizing process.