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SE-8121

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

May / June – 2011

Material Science & Metallurgy

Time : 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. 2 (Sem. 3) (Mech.)**

Name of the Subject :

☛ **Material Science & Metallurgy**

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

Seat No. :

Student's Signature

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **Answer the following question** **16**

a) Define the following term. Also mention the Engineering applications in which you need to consider following property while designing? 1. Ductility 2. Brittleness 3. Fatigue 4. Di-electric strength 5. Thermal conductivity 6. Heat Capacity 7. Hysteresis 8. Castability Support your answer with brief explanation.

b) What do you mean be non destructive testing? Explain in detail Liquid penetration test.

Q.2 **Answer the following: (any two)** **16**

a) Draw & Explain working of Electric arc furnace for making of steel.

b) What do you mean by atomic packing factor? Derive equation of APF for SC & BCC structure.

c) What do you mean by product life cycle? Explain with diagram.

Q.3 **Answer the following: (any two)** **18**

a) Define Peritectic reaction. Draw phase diagram and explain it with different composition.

b) What do you mean by Iron- carbon diagram? Explain the same for carbon content of 1.2 %, 0.8 % and 3 %.

c) "Rate of cooling decides the final structure of the alloy" support the statement by proper diagram.

Q.4 **Answer the following question** **16**

a) Define powder metallurgy. Explain the pre sintering and sintering process of powder metallurgy.

b) What do you mean by metallurgy? Explain the working of cupola furnace with neat sketch.

Q.5 **Answer the following question** **16**

a) What do you mean by corrosion? Explain corrosion mechanism.

b) List and explain in brief harmful effect of corrosion.

Q.6 **Answer the following: (any two)** **18**

a) Mention in brief fundamental principal of heat treatment. Also, explain tempering and Mar tempering heat treatment process.

b) Define hardness. Explain any one method of finding hardness number.

c) Explain with figure Jominy end quenching test to measure the hardness.
