00134

DIPLOMA IN MECHANICAL ENGINEERING

Term-End Examination

June, 2010

BME-050 : ENGINEERING MATERIALS

Time : 2 hours *Maximum Marks : 70*

Note : *Question number **1** is **compulsory**. Attempt **any four** more questions out of the remaining questions numbered **2 to 6**. Use of calculator is permitted.*

1. Select the correct answer from the given alternatives for each part given below : **14x1=14**

(a) Higher the percentage deformation in the material leads to :

(i) Less ductile

(ii) More ductile

(iii) No change in ductility

(iv) None of the above

(b) The maximum elastic energy per unit volume that material can absorb without attaining plastic state is known as _____ .

(i) Modulus of toughness
(ii) Modulus of rigidity
(iii) Modulus of resilience
(iv) Bulk modulus

(c) Tests that are performed in a universal testing machine is _____ .

(i) Tension test
(ii) Compression
(iii) All of the above
(iv) None of the above

(d) The mass of hammer in charpy machine is distributed in _____ plane.

(i) Horizontal
(ii) Vertical
(iii) Circular
(iv) All of the above

(e) Ability of material to resist abrasian cutting or penetration is also attributed to _____ .

(i) Brittleness
(ii) Softness
(iii) Hardness
(iv) None of the above

(f) The principal iron ores are _____ .

(i) taconite

(ii) hematite

(iii) above (i) and (ii)

(iv) None of the above

(g) The highest temperature generated in electric arc furnace is _____ .

(i) 1000°C

(ii) 1500°C

(iii) 1925°C

(iv) 2025°C

(h) Ceramics are basically inorganic crystalline materials characterised by _____ .

(i) low ductility and high melting point

(ii) high ductility and low melting point

(iii) low ductility and low melting point

(iv) high ductility and high melting point

(i) Carborundum, a well known abrassive material and its formula is _____ .

(i) Al_2O_3

(ii) MgO

(iii) SiC

(iv) K_2O

(j) _____ is a commercial term used to designate a process by which zinc coating is produced on iron or low carbon steel.

(i) Electroplating
(ii) Galvanizing
(iii) Hot dipping
(iv) Calorising

(k) _____ covers all aspects of this technology including friction, bearing design, lubrication systems and wear.

(i) Annealing
(ii) Coating
(iii) Powder metallurgy
(iv) Tribology

(l) A reaction in which a complex molecule is formed from a number of simpler molecules that can be alike or unlike is known as _____ .

(i) Polymerisation
(ii) Deformation
(iii) Lubrication
(iv) Thermosetting

(m) In concrete, the ultimate compressive strength is about _____ times its ultimate tensile strength.

(i) 5
(ii) 10
(iii) 15
(iv) 20

(n) The instantaneous applied load divided by the instantaneous cross-sectional area of specimen is _____ .

(i) shear strain

(ii) shear stress

(iii) true strain

(iv) true stress

2. (a) Distinguish between a ductile and a brittle material. Give examples of ductile and brittle materials. **2x7=14**

(b) Describe the procedure for finding Rockwell hardness.

3. (a) Describe the process of steel making with direct arc electric furnace. **2x7=14**

(b) What are the distinguish features of eutectoid, hypo-eutectoid and hyper eutectoid steels ?

4. (a) What is stainless steel ? Mention those properties which distinguish stainless steel from plain carbon steel. **2x7=14**

(b) Define thermal conductivity. Give units of thermal conductivity. Explain mechanism of thermal conduction through materials.

5. (a) Define refractoriness. List at least five refractory materials. Describe the properties of refractory materials. **2x7=14**

(b) What is a glass ? What are different types of glasses ? What are tailor made glass properties ?

6. (a) Define the term lubricant and describe the functions of lubricants. **2x7=14**

(b) Define the term coating. What are the purposes of coatings ? Explain.