

**DIPLOMA - VIEP MECHANICAL
ENGINEERING (DMEVI)**

Term-End Examination

June, 2014

BIME-024 : ENGINEERING METALLURGY

Time : 2 Hours

Maximum Marks : 70

Note : Attempt any five questions. Question no.1 is compulsory. Question and four questions are to be attempted out of question no. 2 to 7.

1. Choose the suitable alternative. 7x2=14
- (a) In metals subjected to cold working, strain hardening effect is due to :
- (i) Twinning mechanism
 - (ii) Dislocation mechanism
 - (iii) Fracture mechanism
 - (iv) None of above
- (b) Which of the following processes does not improve fatigue strength of a component ?
- (i) Nitricling
 - (ii) Case carburizing
 - (iii) Electro-plating
 - (iv) Shot peening
- (c) What is the type of microstructure of 0.4% C steel at 900°C ?
- (i) Austenite
 - (ii) Pearlite
 - (iii) Cementide
 - (iv) Ferrite

- (d) Fine grain sizes are obtained by :
 - (i) Very slow cooling
 - (ii) Decreasing nucleation rate
 - (iii) Fast cooling
 - (iv) All the above
 - (e) For which process, a steel part is heated to the maximum temperature :
 - (i) Full annealing
 - (ii) Process annealing
 - (iii) Normalizing
 - (iv) Hardening
 - (f) Crank shafts are made from :
 - (i) Grey Cast Iron
 - (ii) White Cast Iron
 - (iii) Nodular Cast Iron
 - (iv) Chilled Cast Iron
 - (g) Which one of the following alloying element provides creep resistance in steel ?
 - (i) Titanium
 - (ii) Molybdenum
 - (iii) Niobium
 - (iv) All of above
2. (a) Explain briefly the following mechanical properties of metals : 8
- (i) Elasticity
 - (ii) Plasticity
 - (iii) Hardness
 - (iv) Malleability
- (b) Explain the advantages of Hot working of materials. 6

3. (a) Classify the steels according to the percentage of carbon content. Discuss. 7
(b) What are the typical alloys of copper used in engineering ? Describe briefly their composition and uses of any one alloy. 7
4. (a) Draw a neat sketch of CCT diagram and discuss it. 7
(b) What are the different quenching media ? What is the effect of quenching media on the mechanical properties of hardened steel ? 7
5. (a) Explain the main steps of Powder Metallurgy Process with suitable example. 7
(b) State the advantages and limitations of Powder Metallurgy. 7
6. Name the various Non-Destructive Testing (NDT) methods and explain any two of them. 14
7. Write short notes on any two : 2x7=14
(a) Induction Hardening and Flame Hardening
(b) Resilience and Toughness
(c) Eutectoid Reactions
(d) Super Alloys
-