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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESI 2011/2012**

COURSE NAME : MANUFACTURING
TECHNOLOGY

COURSE CODE : BPB 23303

PROGRAMME : 2 BPA

EXAMINATION DATE : JUNE 2012

DURATION : 3 HOURS

INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSIST OF **THREE (3)** PAGES

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Q1 Mechanical properties and behavior are commonly used test methods employed in assessing various properties.

(a) Explain between engineering stress and true stress.

(10 marks)

(b) Describe the typical stress-strain curve obtained from a tension test where the offset by a strain of 0.2% elongation. Assume that loading continues up to fracture.

(10 marks)

Q2 Pure metals generally do not have sufficient strength for most engineering applications. Consequently, they should have alloyed with various elements which alter their structures and properties.

(a) Differentiate between solute and a solvent.

(10 marks)

(b) Describe the conditions for obtaining:

(i) Substitutional Solid Solutions

(5 marks)

(ii) Interstitial Solid Solutions

(10 marks)

Q3 Atoms can transfer or share electrons with multiple atoms combine to form molecules by attractive forces called bonds through electron interaction.

Explain the basic types of atomic attraction associated with electron transfer.

(15 marks)

- Q4** Three metal pieces being cast have the same volume but different shapes. One is a sphere, one is a cube and the other is a cylinder with height equal to its diameter.

Determine Solidification Time for:

- (a) Sphere (5 marks)
- (b) Cube (5 marks)
- (c) Cylinder (5 marks)
- (d) Determine, which piece will solidify the fastest and the slowest by assuming that $n = 3$ (5 marks)

- Q5** In an orthogonal cutting operation is being carried out under the following condition: $t_o = 0.1$ mm, $t_c = 0.2$ mm, width of cut = 5 mm, $V = 2$ m/s, rake angle = 10° , $F_c = 500$ N, $F_s = 200$ N.

Calculate:

- (a) Rake angle (5 marks)
- (b) Friction angle (5 marks)
- (c) Percentage of the total energy that dissipated in the shear plane. (10 marks)

END OF QUESTION PAPER