

UNIVERSITY OF BOLTON

**SCHOOL OF THE BUILT ENVIRONMENT &
ENGINEERING**

**BENG (HONS) IN MECHANICAL ENGINEERING
BENG (HONS) IN AUTOMOBILE ENGINEERING**

SEMESTER 2 EXAMINATIONS 2009/2010

MATERIALS AND MANUFACTURE I

MODULE NO: AME1022

Date: Friday, 4 June 2010

Time: 2.00 – 4.00 p.m.

INSTRUCTIONS TO CANDIDATES:

There are SIX questions

Answer any FOUR questions

All questions carry equal marks.

Marks for parts of questions are shown in brackets.

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Module No. AME 1022

Q1 a) Describe the events that occur when a specimen undergoes a tensile test. Sketch a plausible stress – strain curve and identify all significant regions and points between them. Assume that loading continues up to fracture. (18 marks)

b) Describe the difference between elastic and plastic deformation. (7 marks)

Total 25 marks

Q2 a) State the main difference between thermoplastic and thermosetting plastic materials. (8 marks)

b) Describe the difference between crystalline and amorphous materials. (8 marks)

c) Describe the essential differences between an element, compound and a mixture. (9 marks)

Total 25 marks

Q3 a) Explain the difference between ionic, covalent and metallic bondings. (10 marks)

b) The bond between the atoms in the hydrogen molecules is called the hydrogen bond :

(i) True
(ii) False (5 marks)

c) Metallic bonds are directional :

(i) True
(ii) False (5 marks)

d) State the four quantum numbers that define the exact location of electrons in orbital. (5 marks)

Total 25 marks

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- Q4 a) Describe the differences between brittle and ductile fracture. (5 marks)
- b) With the aid of sketches, show the difference between the unit cell for body centred cubic, face centred cubic and closed packed hexagonal. (11 marks)
- c) Define :
- (i) Metalloid (3 marks)
 - (ii) Quantum (3 marks)
 - (iii) Allotropy (3 marks)

Total 25 marks

- Q5 a) How are most accident at work related illnesses caused. (8 marks)
- b) Assess the risks for cutting glass fibre composites. (7 marks)
- c) Explain the differences between ferrous metals, non-ferrous metals and non-metals and give one example of each. 10 marks)

Total 25 marks

- Q6 a) List three ways to protect steel from corrosion. (6 marks)
- b) List three common production processes associated with metals. (6 marks)
- c) State the properties and availabilities of commercially pure Aluminium and high purity Aluminium. (7 marks)
- d) Define and state the use of plywood. (6 marks)

Total 25 marks

END OF QUESTIONS