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Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2017/2018**

COURSE NAME : MATERIALS SCIENCE FOR
TEXTILE TECHNOLOGIST

COURSE CODE : BNH 10102

PROGRAMME CODE : BNH

EXAMINATION DATE : JUNE / JULY 2018

DURATION : 2 HOURS **TERBUKA**

INSTRUCTION : ANSWER **FOUR (4)** QUESTIONS ONLY

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

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- Q1**
- (a) Define materials science and materials engineering. (6 marks)
 - (b) Differentiate between face centered cubic and body centred cubic in a unit cell. (8 marks)
 - (c) Give **THREE (3)** types of cast iron and its general properties. (5 marks)
 - (d) Differentiate between ceramic and metal (6 marks)
- Q2**
- (a) You are given a Metal X for certain engineering application. In order to confirm the capability of the Metal X for the required application, you need to know its properties. Identify **TWO (2)** suitable mechanical tests to determine the ability to withstand an applied load and to deform plastically by absorbing energy. (6 marks)
 - (b) Discuss **FOUR (4)** most effective methods of improving fatigue performance which is related to the improvements in design. (8 marks)
 - (c) A 3780 N force is applied to a 0.375 cm diameter nickel wire having a yield strength of 310 MPa and a tensile strength of 379 MPa. Determine;
 - (i) whether the wire will plastically deform, and (5 marks)
 - (ii) whether the wire will experience necking . (2 marks)
 - (d) Illustrate the qualitative engineering stress-engineering strain curves for a ductile polymer, a ductile metal, a ceramic and natural rubber. Rationalize your sketch for each material. (4 marks)
- Q3**
- (a) Define the hardness test. (2 marks)
 - (b) Differentiate between Brinell and Vickers Hardness test. (8 marks)
 - (c) Give **TWO (2)** examples of clay products. (2 marks)
 - (d) Illustrate briefly the basic process to produce clay product. (8 marks)

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- (e) Based on this statement, “Ceramic is known as a brittle material”. Discuss **THREE (3)** drawbacks or disadvantages in designing ceramic component especially for engineering application.

(5 marks)

- Q4** (a) Explain the processes involved during addition polymerization.

(10 marks)

- (b) Differentiate between the function of calcination and sintering in the ceramic processing.

(7 marks)

- (c) Sketch **FOUR (4)** step of extrusion –blow molding.

(8 marks)

- Q5** (a) Define the meaning of plastic deformation.

(2 marks)

- (b) Explain the mechanism of plastic deformation.

(6 marks)

- (c) Sketch the possible tensile stress-strain profile of steel, polypropylene and tiles.

(9 marks)

- (d) Differentiate between Thermogravimetric analysis (TGA) and Differential scanning calorimetry (DSC) in term of measurement process.

(4marks)

- (e) List **FOUR (4)** transition points of thermoset plastic that can be obtained from DSC.

(4 marks)

-END OF QUESTIONS –

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