Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2013/2014

COURSE NAME	:	STRUCTURES AND PROPERTIES OF FIBRES
COURSE CODE	:	BNH 20102
PROGRAMME	:	2 BNH
EXAMINATION DATE	:	JUNE 2014
DURATION	:	2 HOURS
INSTRUCTION	:	ANSWER **FOUR (4)** QUESTIONS ONLY

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

Q1 (a) Textile serviceability includes the five concepts of aesthetics, durability, comfort, appearance retention and care. Describe each aspect, and give **TWO (2)** properties pertaining to each aspect described.

(10 marks)

(b) Define a stress-strain curve. Sketch a general stress-strain curve for polymer and describe how **FOUR (4)** useful quantities can be gathered from the curve.

(10 marks)

Q2 (a) Explain the following terms using appropriate examples/diagram where applicable:

(i) Amorphous region
(ii) Crystalline region
(iii) Filament tow
(iv) Regenerated fibres
(v) Retting
(vi) Xanthating

(12 marks)

(b) Draw a basic fibre classification chart without giving out the fibre example.

(4 marks)

(c) Relate **TWO (2)** fibre size factors to the performance of a fibre.

(4 marks)

Q3 Cotton is a common cellulosic fibre processed in the textile industry, particularly for clothing purpose.

(a) With the aid of a flow chart, explain the main stages of cotton fibre processing (from fibre to fabric) for the production of shirts or blouses.

(10 marks)

(b) Based on the properties of the fibre, write **FOUR (4)** reasons why cotton is suitable for the stated products in **Q3(a)**.

(4 marks)

(c) Discuss **THREE (3)** main differences of cotton fibre as compared to that of wool fibre.

(6 marks)

Q4 (a) Describe **ONE (1)** chemical or physical difference between:

(i) Acetate and triacetate
(ii) Nomex and Kevlar
(iii) Acrylic and modacrylic
(iv) Viscose rayon and Lyocell

(8 marks)

(b) Polyester, polyamide and polyolefin are among the main generic name of man-made fibres available in the market. For each fibre generic name:

(i) Give **ONE (1)** example of the fibre.
(ii) State **ONE (1)** suitable end product made of the fibre.
(iii) Relate **TWO (2)** of the most outstanding physical properties of the fibre to the end product in **Q4(b)(ii)**.

(12 marks)

Q5 (a) Two fibres, Fibre X and Fibre Y compete in a triathlon competition. Each stage passed gives the fibre a better chance in wining. First stage is thermal comfort test at 0°C where Fibre Y scored the highest as it can retain heat and has a good insulation characteristic. Second stage is strength test. Fibre X won this stage as it is known to be stronger than steel (weight to weight). In the last stage Fibre X loose to Fibre Y as Fibre X is soluble to sulphuric acid at 59.5% concentration.

(i) Identify Fibre X and Y.
(ii) Explain the reason of winning for both fibres in each stage.

(8 marks)

(b) Spandex is considered as better elastomer fibre than rubber. Sketch a stress-strain curve graph for both fibre and explain briefly the outcome of the curves.

(6 marks)

(c) Latest development of fibre involves venturing into other non-conventional materials for added value properties. Show the production of the following fibres:

(i) Spider's silk fibres
(ii) Nanofibres
(iii) Polylactic acid fibres (PLA)

(6 marks)

- END OF QUESTION -