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Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2016/2017**

COURSE NAME : STRUCTURE AND PROPERTIES OF FIBRES

COURSE CODE : BNH 20102

PROGRAMME CODE : BNH

EXAMINATION DATE : JUNE 2017

DURATION : 2 HOURS

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

THIS QUESTION PAPER CONSISTS OF EIGHT (8) PAGES

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Q1 Fibre is an essential unit in textile industries. Traditional textile fibres have been used for a long time such as cotton; manmade fibres also have been discovered to give varieties and better fibre properties for many uses.

(a) Describe the importance of fibre in textile production. (4 marks)

(b) Draw a flowchart of textile production and elaborate the processes involved. (9 marks)

(c) Describe the importance of knowing the structure and properties of textile fibre. (2 marks)

(d) Define the following terms:

- (i) Multilobal
- (ii) Tex and Denier
- (iii) Resiliency
- (iv) Polypropylene
- (v) Carbon Fibre
- (vi) Tow
- (vii) Staple fibre
- (viii) Filament fibre
- (ix) Ramie
- (x) Wet spinning

(10 marks)



- Q2** Fibre has specific properties that make it fit to be called textile fibre. Some of the important properties are length, shape and diameter.
- (a) Define properties of staple yarn that affected by the length. (2 marks)
- (b) Select which type of fibre between filament fibre and staple fibre that has good ability and cohesiveness in yarn twisting. Support your selection with proper justification. (4 marks)
- (c) (i) Recognize the fibres in **Figure Q2 (c)**. (4 marks)
- (ii) Then, analyse the microstructures in terms of shape on cross sectional and longitudinal view. (4 marks)
- (d) Colour and lustre is an eye sensation and affected the fabric appearance. Choose which shape in **Figure Q2 (d)** that gives good lustre to the fabrics. Explain your selections. (6 marks)
- (e) Define the colour of the synthetic yarn when it is produced. List **THREE (3)** techniques to colour the synthetic yarn. (5 marks)

- Q3** Sustainability, industrial ecology, eco-efficiency and green chemistry has been taken seriously nowadays. Biodegradable and natural textile fibres are suggested to be used in order to reduce the impact of pollution to environment.
- (a) Propose **FOUR (4)** natural textile fibres that are used in apparel making. (4 marks)
- (b) Cotton is the most widely used in textile production especially in apparel making. Due to research and experienced usage of natural fibres, there is fibre such as flax. In apparel making flax is called linen.
- (i) Sketch cotton plant and flax plant. Label the basic parts of the plant. (6 marks)
- (ii) Compare the properties of cotton and flax in term of the cross section, colour and flammability. (6 marks)
- (c) Apply the suitable fibre cultivation and extraction process for cotton and flax. (6 marks)
- (d) List **THREE (3)** essential processes for silk production. (3 marks)

Q4 Identification of fibre must be done when the fibre is unknown. The identification can be done on wide range of fibres whether natural fibres or manmade fibres.

(a) Classify the following manmade fibre into “*regenerated manmade fibre*” or “*synthetic manmade fibre*”.

- (i) Rayon
- (ii) Lyocell
- (iii) Alginate
- (iv) Melamine
- (v) Polyester
- (vi) Nylon

(6 marks)

(b) In an apparel company, there are interest to produce children’s sleepwear with flammability retardant, children’s sleepwear with antimicrobial function and wedding dress with good drapability and lustre. Choose suitable fibre to suit the interest of the company.

(i) Children’s sleepwear with flammability retardant. Choose between wool, cotton or polyester. Support your selection by comparing each fibre.

(3 mark)

(ii) Children’s sleepwear with antimicrobial function. Choose between nylon, flax or lyocell. Support your selection by comparing each fibre

(3 mark)

(ii) Wedding dress. Choose between linen, viscous rayon or spandex. Support your selection by comparing each fibre

(3 mark)

(c) Organize a simple procedure of experiments to investigate the fibre by:

(i) The macroscopic test in the cross section view and the longitudinal view.

(4 marks)

(ii) Burning test to investigate the burning behaviour.

(2 marks)

(d) Explain the possible results from the experiment in **Q4 (c)**.

(4 marks)

- Q5** Man-made fibres are polymeric in nature. They are produced by joining the poly and mers unit by chemical bonding. The polymerizing process can be by melt spinning unit, wet spinning and dry spinning to produce the filament fibre.
- (a) Differentiate among the processes of melt spinning, wet spinning and dry spinning in producing the manmade fibres. (9 marks)

 - (b) Sketch the schematic diagram of nylon production by melt spinning. (9 marks)

 - (c) List **FOUR (4)** essential step to produce the “*artificial silk*”. (4 marks)

 - (c) Combining two or more fibre to form a yarn is known as fibre blending. The blending of fibres involved the best quality properties of each. List **THREE (3)** objectives of fibre blending. (3 marks)

-END OF QUESTIONS –

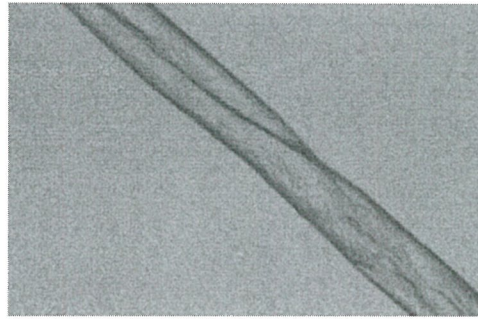
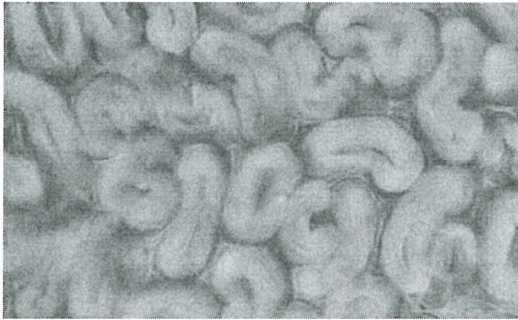
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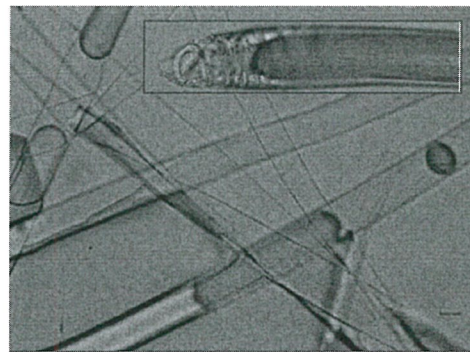
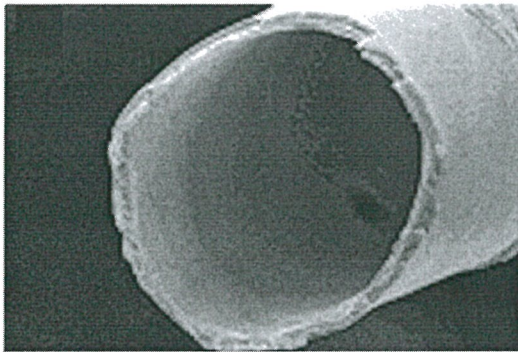
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SEMESTER / SESSION : SEM II / 2016/2017
COURSE NAME : STRUCTURE AND PROPERTIES OF FIBRE

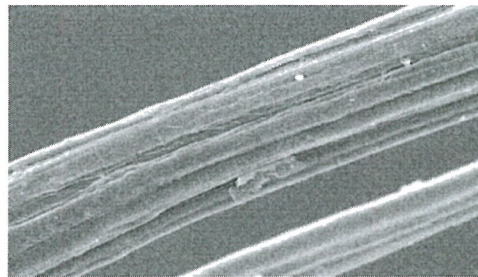
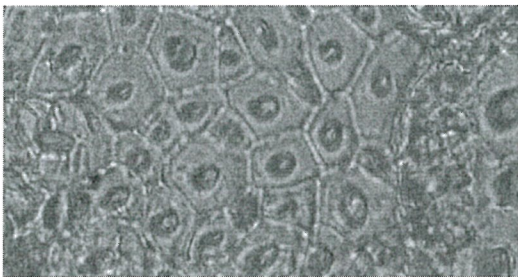
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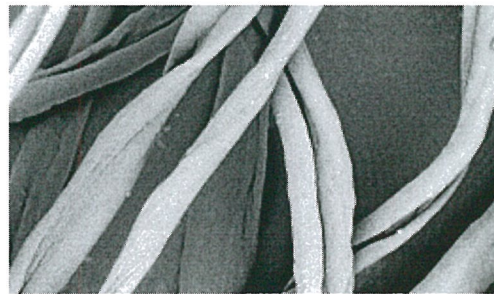
(i)



(ii)



(iii)



(iv)

Figure Q2 (c)

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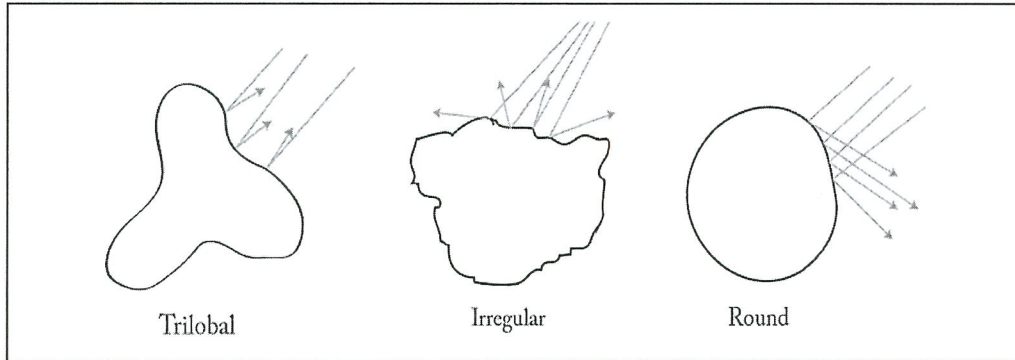


Figure Q2 (d)

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