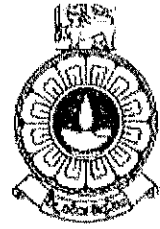THE OPEN UNIVERSITY OF SRI LANKA

DEPARTMENT OF TEXTILE AND APPAREL TECHNOLOGY

BACHELOR OF TECHNOLOGY HONOURS IN

ENGINEERING / BACHELOR OF INDUSTRIAL STUDIES

HONOURS

FINAL EXAMINATION – 2016/2017

TTX6260 – ADVANCED WOVEN FABRIC TECHNOLOGY

DURATION: THREE HOURS

Date: 04th December 2017   **Time: 0930-1230 hours**

Total Number of Questions = 08   **Number of questions to be answered = 06**

Answer the question 01, <u>which is compulsory</u> and five (05) additional questions.

Question 01 carries thirty (30) marks and questions 2 to 8 carry fourteen (14) marks each.

01.   **Compulsory Question.**

   (a)   Distinguish between 'knotting' and 'splicing'.   (02 Marks)

   (b)   Draw the pattern repeat of the yarn path on the center tube for the traverse ratio 3.5.   (02 Marks)

   (c)   List the information that is required to calculate theoretical productivity of a beam warping

         machine.   (02 Marks)

   (d)   Describe what is meant by drawing-in of warp yarns and list the three (03) stages of drawing-in

         process.   (03 Marks)

   (e)   List three (03) advantages of rotary Dobby shedding mechanism over conventional dobby.

                                                                        (03 Marks)

   (f)   State the main economical concern about the rigid rapier looms.   (02 Marks)

   (g)   List four (04) advantages of electronic cloth take-up.   (02 Marks)

   (h)   List the functions of the reed.   (02 Marks)

   (i)   List four (04) factors considered when selecting heald wires for a particular weaving operation.

                                                                        (02 Marks)

   (j)   Briefly explain why weaving machines cannot be operated at the speeds given by the

         manufacturers.   (02 Marks)

(k) List four (04) types of short-term loom stoppages. (02 Marks)

(l) List and briefly elaborate four (04) factors that determine the number of machines assigned to one operator. (04 Marks)

(m) State the cost components considered in greige fabric costing. (02 Marks)

End of the compulsory question.

02. a) Explain what happens to "traverse ratio" and the "angle of wind" during precision winding.

(03 Marks)

b) State one (01) major advantage and one (01) major disadvantage of precision winding.

(02 Marks)

c) A cheese package precision wound on a 5cm diameter empty tube has a height of 16cm. The angles of winding at the start and end are 45^0 and 15^0 respectively. Calculate the diameter of the full package. (04 Marks)

d) With the help of a diagram, explain why it is not suitable to have a traverse ratio of a whole number (like 2, 3, 4...) in winding. (05 Marks)

03. a) Briefly explain the operational principle of "Unifil loom winder". (02 Marks)

b) A loom running at 180 picks/min is fitted with a Unifil loom winder that produces a pirn whose diameter is 28mm when full and 14mm when empty. The fabric width at the reed is 140cm. During winding, 50cm of yarn is wound on to a 5 wind pirn for each single traverse. Each pirn contains 40g of 15tex yarn. Determine the following;

   i. Spindle speed of the Unifil unit if the winding rate exceeds the consumption of weft on the loom by 20%. (04 Marks)

   ii. Time taken to wind a full pirn. (05 Marks)

   iii. Time taken to finish the weft storage in a pirn. (03 Marks)

04. a) Define the following terms in relation to warp sizing. (04 Marks)

      i. Size take-up

      ii. Size percentage

b) Discuss the influence of the size bath/box parameters on size take-up. (07 Marks)

c) A 15 tex Cotton yarn is said to have a size percentage of 12%. Determine the oven-dry mass of size added per/kg of the unsized yarn. Moisture regain of cotton is given as 7.5%. (03 Marks)

05. a) Briefly discuss the technical demerits of air-jet weaving. (05 Marks)

b) Briefly discuss the economical aspects of air-jet weaving. (05 Marks)

c) Discuss the importance of treatment of air used for air-jet loom. (04 Marks)

06. a) Discuss the function of temples used in a weaving machine. (05 Marks)

b) Explain the function of a 'Ring' temple with the aid of a suitable diagram. (05 Marks)

c) Write the advantages and disadvantages of weft accumulators. (04 Marks)

07. a) Write short notes on the following. Use illustrations where necessary. (09 Marks)

      i. Tucked-in selvedge

      ii. Binder selvedge

      iii. Twisted selvedge

b) List five (05) requirements for air conditioning of modern weaving mills considering the efficiency and maintenance of looms and accessories. (05 Marks)

08. a) Discuss the ways in which the weft insertion rate (WIR) of a particular loom can be increased. (03 Marks)

b) An air-jet loom weaves a fabric with 130 cm reed-in width and a projectile loom weaves a fabric with 210 cm reed-in width. Calculate the weft insertion rates of these two machines if they operate at speeds of 900 rpm and 425rpm respectively. (04 Marks)

c) A fabric produced on a loom of 130cm reed width, running at 190 picks/min has the following details;

Warp 15 tex, warp crimp 6%, 24 ends/cm

Weft 20 tex, weft crimp 12%, 20 picks/cm

Running efficiency of the loom is 85%

Calculate the loom production per 08-hour shift. (07 Marks)

-End-