

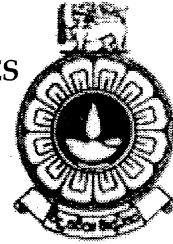
THE OPEN UNIVERSITY OF SRI LANKA

BACHELOR OF TECHNOLOGY ENGINEERING /INDUSTRIAL STUDIES

TTX4232 - TEXTILE COLOURATION

FINAL EXAMINATION - 2014/2015

DURATION - THREE HOURS



Date: 03<sup>rd</sup> August 2015

Time: 0930-1230 hours

*Total number of questions in this paper is 09. Total number of questions to be answered is 06. Question number one is compulsory and carries 25 marks. All the other questions carry fifteen (15) marks each.*

**01. Compulsory question.**

1. Mention three (03) types of hydrolytic desizing methods. (03 Marks)
2. How do you understand the following terms pertaining to processing machines?
  - a. Continuous production
  - b. Batch wise production (02 Marks)
3. Write two (02) types of processing machines where fabric is treated in open-width form in batch wise. (02 Marks)
4. Write two (02) advantages of counter current washing system over continuous open width washing range. (02 Marks)
5. Briefly explain any one of the following terms.
  - a. Chemical wash
  - b. Colloidal wash (02 Marks)
6. List four (04) types of natural thickeners of plant origin. (02 Marks)
7. Define the term 'liquor ratio'. (02 Marks)
8. Give one (01) suitable dye type for each of the following fiber type given below.
  - a. Flax
  - b. Silk
  - c. Nylon
  - d. Polyester (02 Marks)
9. Mention the functions of sodium dithionite in vat dyeing? (02 Marks)
10. List two types (02) of chemical processing machinery where the processing liquor is stationary while the fabric is moving. (02 Marks)

11. List three (03) objectives of heat-setting of polyamide materials prior to dyeing. (02 Marks)
12. State one (01) similarity and one (01) difference between 'relief printing' and 'roller printing' methods. (02 Marks)

-----End of the compulsory question-----

02. (a)
- i. When cellulose materials are boiled with dilute solutions of strong alkalis, unwanted substances of cellulose material undergo hydrolysis and saponification processes. Briefly explain what these terms 'hydrolysis' and 'saponification' mean? (04 Marks)
  - ii. Give two (02) unwanted substances that are hydrolyzed and one (01) unwanted substance that is saponificated during alkali treatment. (03 Marks)
- (b) Compare the advantages and disadvantages of enzymatic desizing method with oxidative desizing method. (08 Marks)

03. (a) With the aid of a simple line diagram, explain the operational principle of Kier boiling. (07 Marks)
- (b) With aid of a clearly labeled diagram explain the functions of mercerization machine. (08 Marks)

04. Write short notes on **any two (02)** of the following. (15 Marks)
- (a) Physical transformations that take place in the fiber during mercerization and effects of these transformations.
  - (b) Working principle of 'optical brighteners' and 'bluing agents'.
  - (c) Explain the action of following bleaching agents.
    - i. Hydrogen peroxide
    - ii. Sodium hypochlorite
    - iii. Sulphur dioxide

05. (a) Briefly explain the functions of following as dyeing assistants in the dye bath. (10 Marks)
- i. Acids
  - ii. Salts
  - iii. Levelling agents
  - iv. Carriers
  - v. Reducing agents

- (b) With the aid of suitable line diagrams briefly discuss the operational principles of any one (01) type of dyeing machine, where the dye liquor is moving while the fabric is stationary. (05 marks)
06. (a) List and briefly explain four (04) factors that must be considered in selecting a dye for a given purpose. (08 Marks)
- (b) Polyester dyeing is difficult due to structural characteristics of the polymer. Explain techniques and chemicals that are used in polyester dyeing process in order to achieve quality dyeing. (07 Marks)
07. (a) Explain the terms 'long liquor dyeing' and 'short liquor dyeing'. (04 Marks)
- (b) Mention two (02) long liquor dyeing machines and two (02) short liquor dyeing machines. (04 Marks)
- (c) Explain two (02) advantages and three (03) disadvantages of **long liquor dyeing machines**. (07 Marks)
08. (a) Considering dyestuff, substrate characteristics and equipment, list and briefly explain three (03) requirements of transfer printing. (06 marks)
- (b) List three (03) advantages of Transfer printing compared to other main printing methods. (03 marks)
- (c) Discuss the different functions of a thickening agent of a printing paste. (06 marks)
09. Compare the printing processes of **direct dye** and **azoic dye** classes based on the following. (15 Marks)
- Printing mechanism (Various steps involved)
  - Types of dyeing assistants that are used
  - Types of fibers that can be dyed
  - Fastness properties
  - End-use applications of the printed material