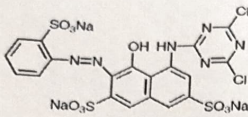
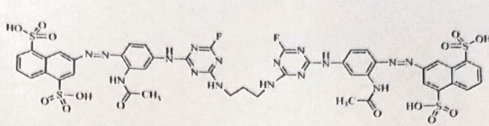


- c. Diffusion of dye molecules stops once an equilibrium is achieved between the concentration of dye in solution and fiber.
- Name a single dye that can be used for dyeing nylon, silk and wool and justify why it is possible. (2)
  - Can all types of hydrolyzed reactive dye display direct dye like properties? Justify your answer by comparing these two reactive dyes. (2)

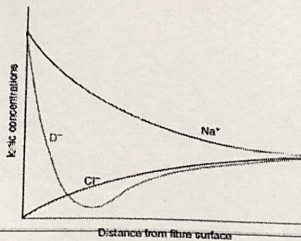


Dye A



Dye B

- What is the most acceptable theory in dyeing of hydrophobic fibres? (2)
- What is rate of dyeing and how the fibre linear density influence rate of dyeing? (2)
- Comment why concentration of dye anions is higher and chlorine anion is almost zero near the fibre surface. (2)



- Arrange the following acid dyes in the order of substantivity and mention their application pH ranges (3)
  - Milling acid dyes
  - Fast acid dyes;
  - Level dyeing or equalising acid dyes;
  - Super-milling acid dyes.
- Why direct dyes have poor washing fastness and how does aftertreatment of the cotton dyed with direct dyes improve its washing fastness? Comment with an example. (3)
- Find out the concentration two coloured solutions according to Beer Lambert's law and indicate which dye colour produce more intense colour at identical concentrations. (3)

	Dye A	Dye B
Absorbance	0.5	0.7
coeff. of extinction	2000 mol <sup>-1</sup> cm <sup>-1</sup> l	3200 mol <sup>-1</sup> cm <sup>-1</sup> l
Path length	1 cm	1 cm

**Section - A: State whether True or False with justification (5 x 1.5 = 7.5)**

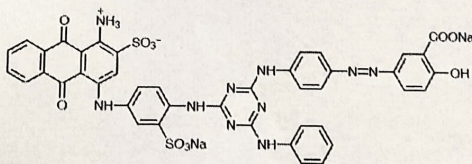
1. In the stages of dyeing "ring-dyed" condition indicates completion of dyeing process \_\_\_\_\_
2. Dyes that are smaller in size and have long linear-shaped molecules diffuse slower than bulky non-linear molecules through water filled pores of fiber \_\_\_\_\_
3. Ethylene diamine-tetra-acetic acid (EDTA) is a surfactant and used for soaping and washing operations after dyeing \_\_\_\_\_
4. The solubility of disperse dyes can be improved by adding alkali \_\_\_\_\_
5. The solubility of the vinyl-sulphone dyes decreases after addition of alkali \_\_\_\_\_

**Section - B Choose the correct answer (5 x 1.5 = 7.5)**

1. For dyeing highly reactive dyes which one of the following methods is best suitable  
a. Pad Steam b. Pad-Dry c. Pad-Dry-Bake d. Pad-Batch
2. For stripping reactive dyes from dyed cotton fabric which one of the following conditions is suitable.  
a. Neutral soaping b. Treatment with copper sulphate  
c. Alkaline reduction followed by oxidation d. Alkaline soaping
3. Which is the most suitable reactive dye for dyeing wool fibers  
a. Procion HE b. di-bromoacrylamido c. di-chloroquinoxaline d. dichlorotriazine
4. The dye molecule that has lowest energy of excitation is capable of absorbing visible spectrum in \_\_\_\_\_ region.  
a. Red b. Blue c. UV d. Indigo
5. Dyeing dark colour using direct dyes should be carried out in  
a. cold conditions b. high liquor ratios c. acidic pH d. high wetting agent

**Section - C: Answer the following. (25)**

1. In the following structure, label the chromophores, auxochromes, solubilizing and bridging groups. (2)



2. What is the role of alkali in reactive dyeing of cellulose? (2)
3. Out of the following statements in dyeing select the one which is not correct in the context of this statement and justify: (2)
  - a. Transfer of dyes from solution to fiber depends on dye solubility, flowrates, fiber nature.
  - b. Diffusion rate of dye molecules increases with increasing thickness of diffusional boundary layer.