

**M.TECH. DEGREE EXAMINATIONS: DECEMBER 2009**

First Semester

**TEXTILE TECHNOLOGY**

TTX504: Theory of Coloration and Finishing

**Time: Three Hours**

**Maximum Marks: 100**

**Answer All the Questions:-**

**PART A (10 x 2 = 20 Marks)**

1. Draw the chemical structure of cotton
2. What is the mechanism by which Hydrogen peroxide acts as bleaching agent?
3. What are the two types of free energy present in thermodynamic function? In what kinds of process do they occur?
4. Write down the Gibbs surface adsorption equation.
5. What are the different intermolecular forces that exists between fibres and dyes?
6. What do you understand by Beer-Lambert law?
7. What is the effect of orientation and Crystallinity of fibres on dyeability?
8. What is the Fick's first law of diffusion?
9. Write down the basic affinity equation in terms of heat and entropy of dyeing.
10. How is the colour difference calculated?

**PART B (5 x 16 = 80 Marks)**

11. (a) (i) Explain the mechanism of scouring of cotton. (8)  
(ii) What is the effect of organic, inorganic and mineral acids on wool and silk? (8)  
(OR)  
(b) (i) Draw the chemical structure of any three textile fibres indicating the functional groups present in them and the suitable classes of dyes for dyeing. (8)  
(ii) What do you understand by Donnan membrane equilibrium? Explain with reference to addition of electrolytes in dyeings. (8)
12. (a) (i) What do you mean by thermo chemistry? Explain the second law of thermodynamics. (6)  
(ii) What do you mean by affinity and how it is different from substantivity? How will you measure the affinity of a dye? Explain the standard affinity equation and its significance (10)

(OR)

- (b) (i) Explain the effect of fine structure of fibres on the dye up-take. Explain as how the fine structure gets modified due to drawing and heat setting and influences in dyeing. (8)
- (ii) Explain the Fick's second law of diffusion. (8)

13. (a) (i) What do you understand by adsorption isotherm? Explain briefly, the different adsorption isotherms, mentioning clearly the dye-fibre combinations in which those are seen in dyeing. (10)
- (ii) How are the differentially-dyeable, also known as dye-variant fibres produced? (6)

(OR)

- (b) Explain any two method by which the dye-fibre bond can be identified.
14. (a) (i) Explain the principle and working of a colour measuring instrument. What are the advantages and limitations of colour measuring systems? (10)
- (ii) Applying a colour data, how is the pass/fail analysis done? (6)

(OR)

- (b) (i) Explain metamerism, tristimulus values, Kubelka-Munk equation, colour difference equations and CIE Lab with reference to instrumental colour assessment. (10)
- (ii) Explain the surface energy and interfacial effects in dyeing. (6)
15. (a) Explain the thermodynamics of dye sorption with reference to any one dye-fibre combination.

(OR)

- (b) Explain how the effect of temperature on rate of diffusion may be expressed quantitatively by determining the activation energy of diffusion.

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