Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.Tech (MCP)/SEM-2/MCP-203/2010

2010

TEXTILE AUXILIARIES AND CHEMICALS

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer any *five* questions. 5 × 14 = 70

1. What do you understand by the term surface tension ? What are the factors upon which it depends on ? Discuss each factors in detail. Name the forces responsible for surface tension and also explain the impact of the forces acting interaction between them. 3 + 2 + 4 + 5

2. Define chemicals and auxiliaries. Differentiate between the two in respect of their activity. Give examples of some chemicals and auxiliareies (at least five for each) mentioning their functions. Briefly explain that all auxiliaries are chemicals but all chemicals are not auxiliaries.

2 + 2 + 5 + 5

3. What do you understand by the term solubility of a solute ? What are the factors affecting the solubility of a solute ? What is solubility curve ? Different materials perform different solubility. Why ? Explain through graphical representation. 2 + 3 + 2 + 7

4. Define compatability of chemicals. How does it play a role in chemical reaction ? In direct dyeing NaCl or Na_2SO_4 is used as an exhaustive agent. Critically explain the function of an exhaustive agent with a suitable diagram. 2 + 4 + 8

5. What is enzyme ? Differentiate between an enzyme and a chemical. Write down the mechanism of an enzyme reaction. Classify different types of enzymes with examples and treatment conditions. Explain with a neat sketch the enzymatic method of desizing of cotton fabrics.
2 + 2 + 2 + 4 + 4

6. What do you understand by the term mordant ? Under what condition the substrate is mordanted ? How it can increase the affinity of the substrate ? Through an application prove that mordanting cellulose increase the affinity of a dye towards it. 2 + 3 + 9

7. What is diazotization and coupling ? Name one of each. Write the reaction mechanism of diazotization and coupling. What are the factors upon which the absorption of naphthol on to the substrate depends on ? In the context of dyeing of textile material, what are the demerits generally faced during coupling of textile materials ? How can it be eliminated ?
2 + 1 + 3 + 2 + 3 + 3

8. a) When a substrate of polynomial structure $f_n(x)$ is disintegrated by a chemical of monomial structure $(x-1)$, it disintegrates the substrate except 5 molecules and when it is disintegrated by an enzyme of monomial structure $(x-2)$, it disintegrates the substrate except 7 molecules. Find the residual number of molecules when it is disintegrated by an enzyme of polynomial structure $(x-1)(x-2)$.

b) The direct dye of matrix $\begin{bmatrix} 4 \\ 1 \end{bmatrix}$ is treated with Na_2CO_3 of matrix "X" in order to produce sodium salt of sulphonic acid of matrix $\begin{bmatrix} -4 & 8 \\ -1 & 2 \end{bmatrix}$. The reaction kinetics is $\begin{bmatrix} 4 \\ 1 \end{bmatrix} X = \begin{bmatrix} -4 & 8 \\ -1 & 2 \end{bmatrix}$ Find X. 7 + 7