



B.TECH DEGREE EXAMINATIONS: JUNE 2017

(Regulation 2015)

Second Semester

U15CHT204: CHEMISTRY FOR TEXTILES

(Common to TXT / FT)

COURSE OUTCOMES

CO1: Design a water purifier (K4)

CO2: Discuss the mechanism of polymer formation (K2)

CO3: Classify dyes and describe its interaction with fibers using bonding (K2)

CO4: Analyze the usage of specialty chemicals in dyes (K3)

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Match each item from the **List I** with **List II** and select one correct combination using the codes CO1 [K₂] given below

List I	List II
A. Anion exchange resin	i. Sodium hexameta phosphate
B. Colloidal agent	ii. Sodium Alumino silicate
C. Permutit	iii. Agar - Agar
D. Calgon	iv. Urea formaldehyde resin

- | | A | B | C | D |
|----|-----|-----|-----|----|
| a) | iii | i | ii | iv |
| b) | iv | ii | iii | i |
| c) | iii | i | iv | ii |
| d) | iv | iii | ii | i |

2. The chemical added in the process of coagulation and flocculation is

CO1 [K₂]

- | | |
|----------------------|----------------------|
| a) Aluminum Sulphate | b) MgCl ₂ |
| c) CaCl ₂ | d) Chlorine |

3. Why is hydrogen bonding only possible with hydrogen? CO3 [K₁]
- a) Hydrogen's nucleus is electron deficient when it bonds with an electronegative atom b) Hydrogen is the only atom that is the same size as an oxygen atom.
- c) Hydrogen is the most electronegative element. d) Hydrogen tends to form covalent bonds.
4. Congored dye is a CO3 [K₁]
- a) Direct dye b) Disperse dye
- c) Vat dye d) Mordant
5. Hydrogen bonding results in CO3 [K₂]
- i) Higher heat of vapourisation
- ii) Higher Boiling point
- iii) Higher melting point
- iv) Higher vapour pressure
- a) i, ii and iii b) i, ii, iii, iv
- c) i and iii d) iii, ii
6. In order to increase Van der Waal's forces CO3 [K₃]
- a) Contact points shall be minimized b) Contact points shall be made extinct
- c) Number of electrons shall be increased d) Number of protons shall be reduced
7. Assertion (A): Polytetrafluoroethene is used in making non-stick cookwares. CO2 [K₂]
Reason (R): Fluorine has highest electronegativity
- a) Both assertion and reason are the true statements and reason is a correct explanation of the assertion b) Both assertion and reason are the true statements and reason is a not correct explanation of the assertion
- c) Assertion is true but reason is false d) Assertion is false and reason is true
8. The chromophore of a dye molecule CO3 [K₁]
- a) Inhibits colouring b) Influences the intensity of the dye.
- c) Acts as a mordant. d) produces color with conjugated systems

9. Sequence the following intra molecular forces of attraction from weakest to strongest CO4 [K₃]
- i. Dipole – Dipole Interaction
 - ii. London dispersion forces
 - iii. H - Bonding
- a) ii , i , iii b) iii, i , ii
 c) i , ii, iii d) iii, ii, i
10. Electrical properties of the polymers decreases with _____ CO2 [K₂]
- a) Increase in humidity b) Dipole in main chain
 c) Decrease in symmetry d) Increase in Tg

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

11. How are zeolites regenerated? CO1 [K₂]
12. Differentiate between scale and sludge. CO1 [K₁]
13. How polymers are classified based on tacticity? Write the examples. CO2 [K₁]
14. Define functionality with examples. CO2 [K₁]
15. Illustrate with suitable reactions the preparation of alizarin dye. CO3 [K₁]
16. Distinguish chromophore from auxochrome with examples. CO3 [K₂]
17. Define coordinate covalent bond. CO3 [K₂]
18. Why ice is less dense than water? CO3 [K₁]
19. List the advantages of leveling agent. CO4 [K₂]
20. Reason out why dye fixing agents are used in textile industries. CO4 [K₂]

Answer any FIVE Questions:-

PART C (5 x 14 = 70 Marks)

(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. Carbon has four unpaired electrons. It can have four equal energy bonds. CO3 [K₃]
 The hybridization of orbitals is also greatly favored because hybridized orbitals are lower in energy compared to their separated, unhybridized counterparts. This results in more stable compounds when hybridization occurs. Explain and account the hybridization involved in the formation of Ethylene and Acetylene with neat sketch of orbital diagram.

22. (i) Illustrate the process involved in the conversion of sea water to fresh water using Electrolysis process (8) CO1 [K₃]
(ii) Describe the internal conditioning processes in softening of water (6) CO1 [K₂]
23. (i) With suitable reaction explain the synthesis of vat dye and explain the structural change occurring during dyeing. (7) CO3 [K₂]
(ii) Explain with suitable examples how dye affinity substrates are used in dyeing for cellulose fibres. (7) CO4 [K₃]
24. (i) Compare and contrast the thermoplastic and thermosetting polymers (7) CO2 [K₂]
(ii) Discuss the free radical mechanism for the polymerization of Ethene. (7) CO2 [K₂]
25. (i) Elaborate on the principle and instrumentation of TG-DTA (7) CO3 [K₁]
(ii) With Illustrations explain the van der Waals forces of attractions existing in molecules. (7) CO3 [K₂]
26. (i) Discuss the effect of polymer structure on properties (7) CO2 [K₂]
(ii) Draw the structure and explain the synthesis of triaryl methane dye. Identify and list the chromophores and auxochromes present in it. (7) CO4 [K₂]
27. (i) Explain the role of retardant and dispersing agents in dyeing process (7) CO4 [K₂]
(ii) Enumerate on the polymerization reactions of vinyl chloride and PET and State their applications. (7) CO2 [K₃]
