



GENERAL INSTRUCTIONS TO THE CANDIDATES

- Candidates are instructed to answer the questions as per Bloom's Taxonomy knowledge level (K₁ to K₆)
- Candidates are strictly instructed not to write anything in the question paper other than their roll number.
- Candidates should search their pockets, desks and benches and handover to the Hall Superintendent/ Invigilator if any paper, book or note which they may find therein as soon as they enter the examination hall.
- Candidates are not permitted to bring electronic watches with memory, laptop computers, personal systems, walkie-talkie sets, paging devices, mobile phones, cameras, recording systems or any other gadget / device /object that would be of unfair assistance to him / her.
- Corrective measures as per KCT examination policies will be imposed for malpractice in the hall like copying from any papers, books or notes and attempting to elicit the answer from neighbours.

B.TECH DEGREE EXAMINATIONS: JUNE 2016

(Regulation 2015)

Second Semester

U15CHT204: CHEMISTRY FOR TEXTILES

(Common to FT & TXT)

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 CO2 [K₂] given below

List I (Polymer)	List II (Polymerizing unit)
A. Nylon 6,6	i. Ethylene glycol with terephthalic acid
B. PET	ii. Ethylene with Ziegler Natta Catalyst
C. LDPE	iii. Hexamethylene diamine with adipic acid
D. HDPE	iv. Ethylene with molecular oxygen

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

2. Reverse Osmosis is used to purify water and to CO1 [K₂]
- a) Remove ions and dissolved organic molecules b) Retain ions in water
- c) Oxidize impurities d) Removes bacteria
3. The stage at which a chemical substance is added to water in order to avoid tooth decay is called as CO1 [K₁]
- a) Precipitation b) Chlorination
- c) Fluoridation d) Filtration
4. The unique property of polymeric materials is CO2 [K₁]
- a) Elasticity b) Viscoelasticity
- c) Plasticity d) Conductivity
5. Which of the following polymers have vinylic monomer units CO2 [K₂]
- i) Acrilan
- ii) Polystyrene
- iii) Nylon
- iv) Teflon
- a) i, ii and iv b) i, ii and iii
- c) i and iii d) Iii and iv
6. A mordant is a substance which is CO3 [K₃]
- a) Colored b) Leuco base of a dye
- c) Fixed dye on the fabric d) Fast to wash and light
7. Assertion (A): Though the central atom of both NH₃ and H₂O molecules are sp³ hybridized, yet H–N–H bond angle is greater than that of H–O–H. CO3 [K₂]
- Reason (R): Nitrogen atom has one lone pair and oxygen atom has two lone pairs.
- 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 dye linked to the fibre in oxidized form is CO4 [K₁]
 a) Acid dyes b) Basic dyes
 c) Vat dyes d) Mordant dyes
9. Arrange the reactants in a sequential manner to synthesis Malachite green CO4 [K₃]
 i) PbO_2 [0] ii) HCl iii) $\text{Con.H}_2\text{SO}_4$
 a) iii, i, ii b) i, ii, iii
 c) iii, ii, i d) i, iii, ii
10. Dipole moment of CO_2 is CO4 [K₂]
 a) 0 b) 1.49
 c) 1.84 d) 1.59

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

11. Illustrate with reactions how Calgon converts hard water into soft water. CO1 [K₂]
12. What are Zeolites? CO1 [K₁]
13. Why do monomers show different reacting tendencies? CO2 [K₁]
14. Define Degree of polymerization CO2 [K₁]
15. State chromophore - auxochrome theory. CO3 [K₁]
16. Classify dyes based on different chromophores. CO3 [K₂]
17. Differentiate ionic bond from covalent bond CO3 [K₂]
18. Why noble gases are non reactive? CO3 [K₁]
19. With an example define a "Dye fixing agent" CO4 [K₂]
20. List the advantages of using retarding agents 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. (i) In earlier year's, textile industry used to use natural resources in order to give an aesthetic appeal via colour. This was then slowly upgraded to meet the demands of society to synthetic substances. Indigo is one such substance. Discuss a synthetic route to prepare indigo to meet the demand. (8) CO3 [K₂]
- (ii) Discuss the disadvantage faced by textile industry in using hard water. State one solution to solve this problem (6) CO1 [K₄]

22. Explain the different processes involved in the domestic water treatment CO1 [K₂]
23. (i) State a dye with chemical structure having a quinoid chromophoric group and two basic auxochromic groups and write its synthesis. (8) CO3 [K₂]
(ii) With examples distinguish between natural and synthetic dyes. (6) CO3 [K₃]
24. (i) Illustrate with chemical reactions the mechanism involved in addition polymerization through the free radical as initiators (8) CO2 [K₂]
(i) List the distinguishing features of thermoplastics and thermosets (6) CO2 [K₂]
25. (i) With a neat orbital diagram and an example explain the formation of sigma and pi bonds in sp^2 hybridization. (8) CO3 [K₁]
(i) Water is an unusual liquid – justify using hydrogen bonding (6) CO3 [K₂]
26. (i) Elaborate the principle, instrumentation and application of DSC (8) CO4 [K₂]
(ii) Discuss the role of mordant in dying process with suitable example. (6) CO4 [K₂]
27. (i) Enumerate the types of vanderwaals forces of attraction between two molecules (8) CO3 [K₂]
(ii) Explain the mechanism by which the dispersing agents facilitate the dyeing process (6) CO4 [K₃]
