Q. Code: 434955

Reg. No. | | | | | | | | | | | | | |

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2024

First Semester

CY22153 – TECHNICAL CHEMISTRY

(Common to BT, CH & CE)

(Regulation 2022)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Describe the fundamental concepts of electrolytic and electrochemical cells and their applications in batteries.	**2**
CO 2	Interpret the fundamental principles of photochemical processes and their applications.	**2**
CO 3	Compare and contrast nanomaterials and bulk materials, synthesis of nanomaterials and applications.	**2**
CO 4	Explain the water hardness and its treatment with a focus on boiler feed water.	**2**
CO 5	Describe the composition, properties and applications of polymers and composites.	**2**

PART- A (20 x 2 = 40 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Why do electrochemical cell stops working after some time?	**1**	**2**
2.	How will you represent the quinhydrone electrode?	**1**	**2**
3.	List any two limitations of zinc-carbon batteries.	**1**	**2**
4.	Quick charging is possible with solid-state batteries. Why?	**1**	**2**
5.	State the Grotthus - Draper law.	**2**	**2**
6.	Why do some of the photochemical reactions have low quantum yields? Give reasons.	**2**	**2**
7.	Write the relationship between the photochemical equilibrium constant K and the intensity of the light.	**2**	**2**
8.	Are photochemistry principles used in food processing? If so, in what way is it used?	**2**	**2**
9.	Differentiate nanoparticles with molecules.	**3**	**2**
10.	Outline the sol-gel method of synthesizing nanoparticles.	**3**	**2**
11.	Compare solvothermal and hydrothermal methods.	**3**	**2**
12.	What are quantum dots?	**3**	**2**
13.	Why is the hardness of water expressed in $CaCO_3$ equivalent?	**4**	**2**
14.	Discuss the principle of internal conditioning of boiler feed water.	**4**	**2**
15.	Mention the steps involved in domestic water treatment.	**4**	**2**
16.	Comment on breakpoint chlorination.	**4**	**2**
17.	Write the structure of the monomers used to prepare Buna-S rubber.	**5**	**2**

18.	Differentiate between addition polymerization and condensation polymerization.	**5**		**2**
19.	Outline the applications of conducting polymers.	**5**		**2**
20.	Write the constituents of composites.	**5**		**2**

PART- B (5 x 10 = 50 Marks)

			Marks	CO	RBT LEVEL
21.(a)	Explain the construction and working principle of the quinhydrone electrode. Mention its merits and demerits.		**(10)**	**1**	**2**
	(OR)				
(b)	With a neat diagram, describe the lead-acid battery technology and its electrode reactions.		**(10)**	**1**	**2**
22.(a)	**(i)**	How will you determine the unknown concentration of iron solution using Beer-Lambert's law?	**(5)**	**2**	**2**
	(ii)	Explain the reason behind the high quantum yield with a suitable example.	**(5)**	**2**	**2**
	(OR)				
(b)	Discuss the various photo-physical processes using the Jablonski diagram.		**(10)**	**2**	**2**
23.(a)	Enumerate the change in characteristic properties of nanomaterials from bulk materials in terms of electrical, optical, magnetic, mechanical and chemical properties.		**(10)**	**3**	**2**
	(OR)				
(b)	Outline any two methodologies for the synthesis of nanomaterials using bottom-up approach.		**(10)**	**3**	**2**
24.(a)	Identify the boiler troubles and preventive measures to be adopted in process industries.		**(10)**	**4**	**2**
	(OR)				
(b)	Explain the demineralization process with a neat diagram. Mention its advantages.		**(10)**	**4**	**2**
25.(a)	Illustrate the mechanism of free radical polymerization. Give an example for free radical initiators.		**(10)**	**5**	**2**
	(OR)				
(b)	Elaborate on metal matrix composites and polymer matrix composites. List out their applications.		**(10)**	**5**	**2**

PART- C (1 x 10 = 10 Marks)

(Q.No.26 is compulsory)

		Marks	CO	RBT LEVEL
26.	How will you estimate the different types of hardness present in the water sample using EDTA method?	**(10)**	4	**2**

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