Q. Code: 492789

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

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2023

First Semester

CY22151 – APPLIED CHEMISTRY

(Common to AD, CS, EE, EC & IT)

(Regulation 2022)

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

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Identify electrochemical cells, corrosion and fundamental aspects of batteries.	**2**
CO 2	Interpret the photochemical reactions and make use of spectroscopic techniques.	**2**
CO 3	Realize the structures, properties and applications of nanoparticles.	**2**
CO 4	Acquire the basic knowledge on chemical sensors to develop an interdisciplinary approach among the students which are essential for the software engineers	**2**
CO 5	Develop theoretical principles of UV-visible and IR spectroscopy and separation techniques	**3**

PART- A (20 x 2 = 40 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Note the overall reaction that takes place inside the lithium-ion battery.	**1**	**3**
2.	Assuming a metal electrode, write the Nernst equation.	**1**	**3**
3.	What are the characteristics of a good battery?	**1**	**2**
4.	Summarise the significant differences between electrolytic and galvanic cells.	**1**	**2**
5.	What type of chemical reaction is initiated by the absorption of light by particles of matter?	**2**	**2**
6.	Which are the two fundamental laws of photochemistry?	**2**	**3**
7.	List any two high quantum yield causes or explanations in your writing.	**2**	**3**
8.	Write about any two applications of photochemistry.	**2**	**2**
9.	Give a clarification of the surface plasmon resonance (SPR) concept.	**3**	**2**
10.	Address the fundamental distinction between bulk materials and nanoparticles.	**3**	**3**
11.	Identify the root cause of the argon gas used in the ion sputtering compartment.	**3**	**3**
12.	List the materials utilised for Cu on Cu via electrodeposition.	**3**	**2**
13.	List the electrodes in a three-electrode setup.	**4**	**2**
14.	Sketch a diagram of the chemical sensor.	**4**	**2**
15.	List the various kinds of sensors employed in everyday life.	**4**	**4**
16.	Construct a dropping mercury electrode (DME).	**4**	**2**
17.	Chemical analyses are affected by at least two types of errors. What are they?	**5**	**3**
18.	Sort the key instrumental approaches for chemical analysis.	**5**	**2**

19.	List the various chromatography types.	**5**	**3**	
20.	Mention any two applications of chromatography.	**5**	**2**	

PART- B (5 x 10 = 50 Marks)

		Marks	CO	RBT LEVEL
21. (a)	What does a mercury-mercurous chloride electrode in contact with a solution of potassium chloride (KCl) mean? How it is used in conjunction with a working electrode to measure the potential difference between two electrodes?	**(10)**	**1**	**3**
	(OR)			
(b)	What is a lead-acid battery? Draw a diagram to represent the chemical process of charging and discharging.	**(10)**	**1**	**3**
22. (a)	Define the Beer-Lambert's Law and derive an equation.	**(10)**	**2**	**3**
	(OR)			
(b)	Write in detail about the estimation of iron by colorimetry.	**(10)**	**2**	**3**
23. (a)	Provide examples of how nanomaterials are used in any five different fields.	**(10)**	**3**	**2**
	(OR)			
(b)	Identify the five important properties of nanomaterials.	**(10)**	**3**	**2**
24. (a)	Write about electrochemical sensors, including their definition, functioning and uses.	**(10)**	**4**	**3**
	(OR)			
(b)	What is a potentionmetric sensor? Write down the types that were used to determine the analytical concentration of an analyte.	**(10)**	**4**	**3**
25. (a)	Explain the working procedure of UV-Vis spectroscopy with a neat block diagram and write their applications.	**(10)**	**5**	**3**
	(OR)			
(b)	Explain the different modes of vibration while IR-range light is passed through water like a bend-structured molecule.	**(10)**	**5**	**3**

PART- C (1 x 10 = 10 Marks)
(Q.No.26 is compulsory)

		Marks	CO	RBT LEVEL
26.	How can you separate individual compounds from the mixture containing A, B, and C compounds? And how to do primary spectral analysis on the separated compounds.	**(10)**	**5**	**5**