Q. Code: 742335

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

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

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	Describe the fundamental concepts of electrolytic and electrochemical cells and their application 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	Clarify the characteristics of chemical and electrochemical sensors.	**2**
CO 5	Explain the source of the errors and the different instrumentation techniques.	**2**

PART- A (20 x 2 = 40 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Bring out the limitations of standard hydrogen electrode.	**1**	**2**
2.	Can we use a nickel spatula to stir a solution of copper sulphate? $E^{o}_{Ni2+/Ni}$ = +0.025 V; $E^{o}_{Cu2+/Cu}$ = +0.34 V.	**1**	**2**
3.	Copper gets deposited on iron nail, immersed in copper sulphate solution. Give reason.	**1**	**2**
4.	Is it possible to utilize an irreversible reaction to produce electricity?	**1**	**2**
5.	Give any two difference between photochemical and thermal reactions.	**2**	**2**
6.	Compare free energy change in photochemical and thermal reactions.	**2**	**3**
7.	State Stark-Einstein law of photochemical equivalence.	**2**	**2**
8.	Mention the reasons for the high quantum yield.	**2**	**2**
9.	What is the difference between nanoscience and nanotechnology?	**3**	**2**
10.	Provide any one difference between top down and bottom up approach in nanotechnology.	**3**	**2**
11.	Suggest one example for the stabilizing agent used in nanosynthesis.	**3**	**2**
12.	What is nanophotonics?	**3**	**2**
13.	Indicate the components in a chemical sensor.	**4**	**2**
14.	Draw the scheme of functioning of a chemical sensor.	**4**	**2**
15.	Propose the principle of voltammetry.	**4**	**2**

16.	List any one application of amperometry.	**4**	**2**	
17.	IR spectra is often characterized as molecular finger print. Justify this statement.	**5**	**2**	
18.	Compare chromophore and auxochrome.	**5**	**2**	
19.	Why is oxygen unsuitable as a carrier gas for GLC?	**5**	**2**	
20.	Define R_f value.	**5**	**2**	

PART- B (5 x 10 = 50 Marks)

		Marks	CO	RBT LEVEL
21. (a)	Derive the Nernst's equation for single electrode potential.	**(10)**	**1**	**2**
	(OR)			
(b)	Construct the lead acid battery and describe its working principle with electrode reactions.	**(10)**	**1**	**2**
22. (a)	With the Jablanski diagram, discuss the phenomena of phosphorescence and fluorescence.	**(10)**	**2**	**2**
	(OR)			
(b)	Elaborate the mechanism of photosensitization reaction with an example.	**(10)**	**2**	**2**
23. (a)	Elaborate the applications of Nanotechnology in any four fields.	**(10)**	**3**	**2**
	(OR)			
(b)	Outline any two methods of nanosynthesis with a proper diagram.	**(10)**	**3**	**2**
24. (a)	Describe the determination of the concentration of an analyte by Potentiometric sensors.	**(10)**	**4**	**2**
	(OR)			
(b)	Illustrate the applications of chemical sensors in any two fields.	**(10)**	**4**	**2**
25. (a)	Elucidate the principle and instrumentation of IR spectroscopy with a block diagram.	**(10)**	**5**	**2**
	(OR)			
(b)	Describe the principle, instrumentation and applications of Gas Chromatography.	**(10)**	**5**	**2**

PART- C (1 x 10 = 10 Marks)

(Q.No.26 is compulsory)

		Marks	CO	RBT LEVEL
26.	Elaborate the unique characteristics of nanoparticles.	**(10)**	**3**	**2**

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