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Pages: 2

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S1(S) Examinations May 2026 (2024 Scheme)

Course Code: GXCYT122

Course Name: CHEMISTRY FOR INFORMATION SCIENCE / ELECTRICAL SCIENCE

Max. Marks: 60 Duration: 2 hours 30 minutes

PART A

(Answer all questions. Each question carries 3 marks.)

		CO	Marks
1	Calculate the EMF of the following Zn-Ag cell at 298K if the concentration of $ZnSO_4$ and $AgNO_3$ are 0.19M and 0.02M, respectively. Write the electrode reactions also. $E^0_{Zn^{2+}/Zn}$= -0.76V and $E^0_{Ag^+/Ag}$= +0.8V.	(1)	(3)
2	What is cathodic protection? Describe the principle of sacrificial anodic protection.	(1)	(3)
3	Give any three significant applications of dye-sensitised solar cells.	(2)	(3)
4	Explain any one synthesis method of polyaniline, along with its chemical equation. Give two applications of polyaniline.	(2)	(3)
5	Which of the following molecules can give IR absorption? Write the reason for their IR activity. a) O_2 b) N_2 c) H_2O d) HCN e) HCl	(3)	(3)
6	Absorbance of a solution in a 1cm cuvette is measured as A_1. How does the absorbance change for the same solution when a 2 cm cuvette is used instead of a 1 cm cuvette? Explain mathematically using Beer–Lambert's law.	(3)	(3)
7	Define breakpoint chlorination and illustrate it with a neat graph.	(4)	(3)
8	Mention any three goals related to sustainable development.	(4)	(3)

PART B

(Answer any one full question from each module, each question carries 9 marks)

Module -1

			CO	Marks
9	a)	Describe the calomel electrode with a neat constructional sketch. Also write the electrode reaction when it acts as an anode and cathode.	(1)	(5)
	b)	What is corrosion? Explain the mechanism of electrochemical corrosion of iron in acidic medium.	(1)	(4)

10	a)	State the principle of electroless plating. Explain the procedure and overall reaction for electroless copper plating.	(1)	(5)
	b)	Write the anodic and cathodic reactions for a lithium-ion cell in both charging and discharging modes.	(1)	(4)

Module -2

11	a)	Explain the classification of nanomaterials based on their dimensional characteristics and material composition, citing an example for each.	(2)	(6)
	b)	List any three properties of graphene.	(2)	(3)
12	a)	Explain the construction and working of OLED with the help of neat labelled sketch. Give any two applications of OLED.	(2)	(6)
	b)	What are fire-retardant polymers? Give one example each of halogenated and non-halogenated fire-retardant polymers.	(2)	(3)

Module -3

13	a)	Explain with examples, the possible electronic transitions that occur in molecules during UV-visible absorption.	(3)	(6)
	b)	How does IR spectroscopy help in identifying functional groups and bond strengths?	(3)	(3)
14	a)	What is the principle of Scanning Electron Microscopy (SEM)? Draw and explain the diagram of the SEM instrument.	(3)	(6)
	b)	List any three applications of Dielectric Thermal Analysis.	(3)	(3)

Module -4

15	a)	What is reverse osmosis? Explain the desalination of brackish water using reverse osmosis. Give any two advantages of it.	(4)	(6)
	b)	A sample of water contains $Ca(HCO_3)_2$= 40.5 ppm; $Mg(HCO_3)_2$=36.5 ppm; $MgSO_4$=30 ppm; $CaSO_4$=34 ppm; $CaCl_2$=27.75 ppm and NaCl=10 ppm. Calculate the temporary and permanent hardness of the water sample.	(4)	(3)
16	a)	Explain the trickling filter and UASB processes in wastewater treatment.	(4)	(6)
	b)	Discuss the chemistry behind ozone depletion by chlorofluorocarbons.	(4)	(3)

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