SRI SAI RAM ENGINEERING COLLEGE

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Question Paper Code	14179

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

First Semester

Civil Engineering

(Common to All Branches except CSBS)

24BSCY101 - ENGINEERING CHEMISTRY

Regulations - 2024

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)
Answer ALL Questions

		Marks	K-Level	CO
1.	Which of the following is a biodegradable polymer?	1	K1	CO1
	(a) Polyethylene (b) Polystyrene (c) Polyaniline (d) Polypropylene			
2.	Which of the following is a common application of polyvinyl chloride (PVC)?	1	K1	CO1
	(a) Food packaging (b) Electrical wiring insulation			
	(c) Medical devices (d) All of the above			
3.	An electrolyte contains	1	K1	CO2
	(a) Only cations (b) Only anions (c) Metal (d) Ionic solution			
4.	What is the typical voltage range of a single lithium-ion cell?	1	K1	CO2
	(a) 1.2V - 1.5V (b) 1.5V - 1.8V (c) 2.0V - 2.5V (d) 3.0V - 4.2V			
5.	Which of the following components is commonly used as a light source in IR spectroscopy?	1	K1	CO3
	(a) Xenon lamp (b) Tungsten filament lamp			
	(c) Nernst glower (d) Deuterium lamp			
6.	The fundamental vibrational mode of CO_2 is	1	K2	CO3
	(a) 1 (b) 2 (c) 3 (d) 4			
7.	Which is suitable for spontaneous process	1	K1	CO4
	(a) $\Delta S_{Total} = 0$ (b) $\Delta S_{Total} < 0$ (c) $\Delta S_{Total} > 0$ (d) $\Delta S_{Total} = 1$			
8.	In an "isobaric process"	1	K1	CO4
	(a) Temperature remains constant. (b) Volume remains constant.			
	(c) No heat is transferred (d) Pressure remains constant.			
9.	Knocking in engines is caused by:	1	K1	CO5
	(a) Low pressure in the cylinder (b) High octane rating of the fuel			
	(c) Premature combustion of fuel-air mixture (d) Incomplete combustion of the fuel			
10.	Which of the following methods is used for synthesizing nano particles by breaking larger particles?	1	K1	CO6
	(a) Sol-gel method (b) Chemical reduction (c) Vapor deposition (d) Ball milling			

PART - B (12 × 2 = 24 Marks)
Answer ALL Questions

		Marks	K-Level	CO
11.	Why thermosetting plastics cannot be remolded?	2	K2	CO1
12.	What is a copolymer? Give an example.	2	K2	CO1
13.	What is Standard electrode potential?	2	K2	CO2
14.	List the advantages of solid-state batteries.	2	K2	CO2
15.	Define the term quantum yield in photochemistry.	2	K2	CO3
16.	What is finger print region? Mention its important uses?	2	K2	CO3

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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17. What is Clausius inequality?	2	K2	CO4
18. Define the Kelvin statement of II law of thermodynamics.	2	K2	CO4
19. Write the Dulong's Formula for GCV & NCV.	2	K2	CO5
20. Define Cetane number.	2	K2	CO5
21. What are nano clusters?	2	K1	CO6
22. What is the top-down method?	2	K1	CO6

PART - C (6 × 11 = 66 Marks)
Answer ALL Questions

23.	a)	Explain the free radical mechanism of addition polymerization with suitable initiator.	11	K2 CO1
		OR		
	b)	Discuss the preparation, properties and uses PVC & Nylon-6, 6.	11	K2 CO1
24.	a)	Derive the Nernst equation for the equilibrium reaction given below and outline its applications. $M^{n+} + ne^- \rightleftharpoons M$.	11	K3 CO2
		OR		
	b)	Demonstrate the construction and working principles of the Lead–acid battery with relevant reactions.	11	K3 CO2
25.	a)	Using the Jablonski diagram explain the mechanism involved in photophysical process.	11	K2 CO3
		OR		
	b)	How can you derive the Beer-Lambert law and use it to determine the unknown concentration of a solution?	11	K2 CO3
26.	a)	Derive all the four Maxwell relations.	11	K3 CO4
		OR		
	b)	Derive an expression of Van't Hoff isotherm.	11	K3 CO4
27.	a)	Describe the manufacture of metallurgical coke by Otto – Hoffman oven method and discuss the recovery of various byproducts.	11	K3 CO5
		OR		
	b)	Write notes on: i) Gobar gas and ii) Biodiesel.	11	K3 CO5
28.	a)	Discuss the CVD and electrodeposition techniques for the synthesis of nanoparticles.	11	K2 CO6
		OR		
	b)	Discuss the applications of Nanomaterials in various fields.	11	K2 CO6