PRAKASAM ENGINEERING COLLEGE

Accredited by NAAC with B++ Grade, Recognized under 2(f),12(B) of UGC Act 1956
(Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada)
Kandukur (M), SPSR Nellore Dist., AP – 523105
Website: https://prakasamec.com

Programme:B.Tech	AcademicYear:2023-24
Year: I	Semester:II
CourseTitle:ENGGCHEMISTRY	CourseCode: P231209
NameofFaculty: S.HIMABINDU Asst Professor	

UNIT-I

S.No	Topics	No.ofSession Planned	Teaching Method/ Aids	Reference
1	Introduction	1	BB	T1,R1
2	Soft and hard water	1	BB	T1,R1
3	Estimation of hardness of water by EDTA Method	2	BB	T1,R1
4	Estimation of dissolved Oxygen	1	BB	T1,R1
5	Boiler troubles–Priming, foaming, scale and sludge	1	BB	T1,R1
6	Caustic embrittlement,	2	BB	T1,R1
7	Industrial water treatment	1	BB	T1,R1
8	Specifications for drinking water	1	BB	T1,R1
9	Bureau of Indian Standards (BIS) and World health organization (WHO) standards	1	BB	T1
10	Ion-exchange processes -	1	BB	T1,R1
11	desalination of brackish water	1	BB	T1,R1
12	Reverse Osmosis, and electrodialysis.	1	BB	T1

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UNIT-II

S.No	Topics	No.of Sessions Planned	Teaching Method/ Aids	Reference
1	Electrodes–electrochemical cell	1	BB	T1,R1
2	Nernst equation, cell potential calculations	1	BB	T1,R1
3	Primary cells – Zinc-air battery	2	BB	T1,R1
4	Secondary cells – Nickel-Cadmium (NiCad) battery working principle of the batteries including cell reactions	1	BB	T1,R1
5	lithium ion battery working principle of the batteries including cell reactions	1	BB	T1,R1
6	Fuelcells- Basic Concepts, the principle and working of hydrogen-oxygen Fuel cell.	1	BB	T1,R1
7	Corrosion: Introduction to corrosion	1	BB	T1,R1
8	Electrochemical theory of corrosion	1	BB	T1,R1
9	Differential aeration cell corrosion, galvanic corrosion	1	BB	T1,R1
10	Metal oxide formation by dry electrochemical corrosion	1	BB	T1,R1
11	Pilling Bed worth ratios and uses	1	BB	T1,R1
12	Factors affecting the corrosion	1	BB	T1,R1
13	Cathodic and anodic protection,	1	BB	T1,R2
14	Electroplating and electroless plating (Nickel and Copper)	1	BB	T1,R2

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UNIT-III

S.No	Topics	No.ofSessions Planned	Teaching Method/ Aids	Reference
1	Introduction to polymers	1	BB	T1,R1
2	Functionality of monomers	2	BB	T1
3	Mechanism of chain growth, step growth polymerization.	2	BB	T1,R2
4	Thermoplastics and Thermo-setting plastics	1	BB	T1,R1
5	Preparation, properties and applications of polystyrene. PVC Nylon 6,6	1	BB	T1,R11
6	Preparation, properties and applications of Bakelite	2	BB	T1,R1`
7	Elastomers-properties and applications of BunaS, BunaN, Thiokol rubbers	1	BB	T1,R1
8	Fuels – Types of fuels, Preparation calorific value of fuels	1	BB	T1,R1
9	Numerical problems based on calorific value	1	BB	R1
10	Analysis of coal (Proximate and Ultimate analysis),	1	BB	T1,R1
11	Liquid Fuels, refining of petroleum,	1	BB	T1,R1
12	Octane and Cetane number	1	BB	T1,R1
13	Alternative fuels- propane, methanol, ethanol and bio fuel-bio diesel.	2	BB	T1,R1

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UNIT-IV

S.No	Topics	No.of Sessions Planned	Teaching Method/ Aids	Reference
1	Composites- Definition, Constituents, Classification	**1**	BB	T1,R1
2	Particle, Fiber and Structural reinforced composites, properties and Engineering applications	2	BB	R1
3	Refractories-Classification, Properties, Factors affecting the refractory materials and Applications	2	BB	T1,R1
4	Lubricants-Classification, Functions of lubricants, Mechanism	1	BB	T1,R1
5	Properties of lubricating oils –Viscosity, Viscosity Index, Flashpoint, Firepoint, Cloudpoint, saponification and Applications.	2	BB	T1,R1
6	Building materials-Portland Cement	1	BB	T1,R1
7	Portland Cement, constituents	1	BB	T1,R1
8	Setting and hardening of cement.	1	BB	T1,R1

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UNIT-V

S.No	Topics	No.of Sessions Planned	Teaching Method/ Aids	Reference
1	Introduction to surface chemistry,	**1**	BB	T1,R1
2	Colloids, micelle formation, synthesis of colloids (Braggs Method),	2	BB	R1
3	Nanometals and Nanometal Oxides	2	BB	T1,R1
4	Chemical and biological methods of preparation of nanometals and metal oxides	1	BB	T1,R1
5	Stabilization of colloids and nanomaterials by stabilizing agents,	2	BB	T1,R1
6	Adsorption isotherm (Freundlichand Longmuir), BET equation (no derivation)	1	BB	T1,R1
7	Applications of colloids and nanomaterials– catalysis, medicine, sensors, etc.	1	BB	T1,R1

Text Books	
Text1	Jain and Jain, EngineeringChemistry,16/e,DhanpatRai,2013.
Text2	Peter Atkins, Juliode Paula and James Keeler, Atkins'PhysicalChemistry,10/e, Oxford University Press, 2010.

Reference Books	
Ref-1	Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
Ref-2	J.D.Lee, Concise Inorganic Chemistry, 5th Edition,WileyPublications,Feb.2008
Ref-3	Textbook of Polymer Science, Fred W.BillmayerJr,3rdEdition

WEB REFERENCES :

W-1 https://www.thermodyneboilers.com/boiler-problems/

W-2 https://www.sciencedoze.com/2022/03/conducting-polymers-definition-examples.html

W-3 https://www.scribd.com/presentation/497847401/Analysis-of-Coal

W-4 **https://www.atriainnovation.com/en/what-are-shape-memory-materials/**

VIDEO REFERENCES:

1. https://youtu.be/ctlHNf1s6RM?si=FnrLSa3uXqzPZtDR -Ion exchange process
2. https://www.youtube.com/live/rPv35HuWLW0?si=8pIqwhWd8IWyHOZZ -Corrosion
3. https://youtu.be/1dG0PmKFsQA?si=u83MUinL3KQs4mKd -Conducting polymers
4. https://youtu.be/SayZyTMROxk?si=CCB22VarlU6SIygw -moving bed catalytic cracking
5. https://youtu.be/I7doX1zWGdw?si=NhhkbRfuJ24j0QvM -shape memory materials

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Name of the facult				Academic Year:	2023-2024	
Branch & Section:	CIVIL			Examination:	1-Internal	
Course Name:	Engineering chemistry			Year:	I	
				Semester:	II	
Course Outcomes	**1st Internal Exam**	**2nd Internal Exam**	**Internal Exam**	**University Exam**	Attainment Level	
CO1	3.00		3.00	2.00	2.30	
CO2	3.00		3.00	2.00	2.30	
CO3	3.00		3.00	2.00	2.30	
CO4	3.00	3.00	3.00	2.00	2.30	
CO5		3.00	3.00	2.00	2.30	
CO6		3.00	3.00	2.00	2.30	
Internal & University Attainment:			3.00	2.00		
Weightage			30%	70%		
CO Attainment for the course (Internal, University			0.90	1.40		
CO Attainment for the course (Direct Method)			2.30			

Overall course attainment level	**2.30**

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Program Outcome Attainment (from Course)

Name of Faculty:		Academic Year:	2023-2024
Branch & Section:	CIVIL	Year:	I
Course Name:	Engineering chemistry	Semester:	II

CO-PO mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2				1	1					2		
CO2	3	2			1	1	1					1		
CO3	2	2					2					1		
CO4	3	2					1					1		
CO5	2	2					1							
CO6	3	2			1		1					2		
Course	**2.60**	**2.00**			**1.0**	**1.0**	**1.10**					**1.10**		

CO	**Course Outcome Attainment**
CO1	2.30
CO2	2.30
CO3	2.30
CO4	2.30
CO5	2.30
CO6	2.30
Overall course attainment level	**2.30**

PO-ATTAINMENT

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO Attainment	**1.99**	**1.53**			**0.77**	**0.77**	**0.84**					**0.84**

CO contribution to PO - 33%, 67%, 100% (Level 1/2/3)

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PRAKASAMENGINEERING COLLEGE

(AUTONOMOUS)

B.Tech I Year II Semester (R23) Regular Examinations July-2024

ENGINEERINGCHEMISTRY

(Common to CE, ME)

Time:3hours Max.Marks:70

PART– A

(Compulsory Question)

Answerthefollowing:(10 X02=20 Marks)			BTL	CO	Marks
1	a	Definethetemporaryandpermanenthardnessofwater?	BTL 1	CO1	2M
	b	Writeanyfour specificationsofpotablewater?	BTL 1	CO1	2M
	c	DefineNernstequation?	BTL 1	CO2	2M
	d	WhatisPilling-Bedworthrule?	BTL 1	CO2	2M
	e	WhatistheFunctionalityofapolymer?	BTL 1	CO3	2M
	f	DefineCetanenumberofdiesel?	BTL 1	CO3	2M
	g	WhatisthecompositionofPortlandcement?	BTL 1	CO4	2M
	h	DefineCloudpointandSaponification?	BTL 1	CO4	2M
	i	Whatarecolloids?Givetwoexamples?	BTL 1	CO5	2M
	j	Distinguishbetweenphysicaladsorptionandchemisorption?	BTL 2	CO5	2M

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PART– B

Answer all five units:(5 X10 =50Marks)			BTL	CO	Marks
		UNIT-I			
2	a	Explaintheformationofscalesandsludgesinboilerfeed water?	**BTL 3**	**CO1**	5M
	b	DescribetheIonexchangeprocessfordemineralizationofhardwater?	**BTL 2**	**CO1**	5M
		OR			
3	a	Howtoestimatethedissolvedoxygeninwater byWinkler's method?	**BTL 2**	**CO1**	5M
	b	Explainthedesalinationofbrackishwaterby ReverseOsmosis?	**BTL 3**	**CO1**	5M
		UNIT– II			
4	a	DescribetheConstructionandWorkingofelectrochemicalcell?	**BTL 2**	**CO2**	5M
	b	Explainvariousfactorsaffectingtherateofcorrosion?	**BTL 3**	**CO2**	5M
		OR			
5	a	Writeshort notes onworkingofLi-ionBatteries?	**BTL 2**	**CO2**	5M
	b	WhatisElectroplating?Explainelectroplatingof Copper?	**BTL 3**	**CO2**	5M
		UNIT– III			
6	a	DistinguishbetweenThermoplasticsandThermosettingplastics?	**BTL 2**	**CO3**	5M
	b	Giveanaccountonthesynthesis,propertiesandapplicationsofBakelite?	**BTL 2**	**CO3**	5M
		OR			
7		ExplaintheUltimateanalysisofcoalanditssignificance	**BTL 3**	**CO3**	10M
		UNIT– IV			
8	a	Giveanaccount onthepropertiesofrefractorymaterials?	**BTL 2**	**CO4**	5M
	b	Classifylubricantsandgiveexamplesforeach?	**BTL 2**	**CO4**	5M
OR					
9	a	Discussthefunctionsandpropertiesoflubricants?	**BTL 2**	**CO4**	5M
	b	Writeabriefaccount onsettingandhardeningofPortlandcement?	**BTL 2**	**CO4**	5M
		UNIT– V			
10	a	ExplainthesynthesisofcolloidsbyBragg'smethod?	**BTL 3**	**CO5**	5M
	b	Discussvariousapplicationsofnanomaterialsincatalysisandmedicine??	**BTL 2**	**CO5**	5M
OR					
11	a	Writeanoteonstabilizationofnanomaterialsbystabilizingagents?	**BTL 2**	**CO5**	5M
	b	Outlinethedifferenttypesofadsorptionisotherms?	**BTL 3**	**CO5**	5M

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I B.TECH II SEM MID-I EXAMINATIONS

SUB: ENGINEERING CHEMISTRY

BRANCH: CIVIL **DATE: 18 /04/2024**

3*5=15M

Write the following questions

1)How do you estimate Disolved Oxygen (DO) in water is determinedby Winkler's Method

Or

2)Describe the estimation of hardness of water by EDTA Method

3)Briefly Explain about the Boiler troubles and their treatment

Or

4)Explain various factors influencing the state of corrosion

5)Write a note on sacrificial anodic protection

Or

6)Discuss in detail about chemical loss by corrosion

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I B.TECH II SEM MID-II EXAMINATIONS

SUB: ENGINEERING CHEMISTRY

BRANCH:CIVIL DATE: **22/06/2024**

Write the following questions

1) Define plastics. Write the difference between thermos and thermos setting plastics.

Or

2) Write the preparation, properties and applications of Bakelite.

3) Write the proximate analysis of Coal.

Or

4) Write the refining of Petroleum with neat sketch.

5) Define Refractories. Write the properties of refractories.

Or

6) Define lubricants. Write the properties of lubricants

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