Hall	Ticket	Num	ber:

Code No. : 11126 N/O

## VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

## B.E. I-Semester Main & Backlog Examinations, Jan./Feb.-2024

## **Applied Chemistry**

(Common for Civil & Mech.)

Time: 3 hours

Max. Marks: 60

## Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A  $(10 \times 2 = 20 \text{ Marks})$ 

Q. No.	Stem of the question	M	L	со	РО
1.	Write any two applications of electrochemical series.	2	2	1	1,2,12
2.	0.02 N solution of an electrolyte offers a resistance of 240 ohms in a conductivity cell whose cell constant is 0.98/cm. Calculate the equivalent conductance of the electrolyte.	2	3	1	1,2,12
3.	Differentiate between primary and secondary batteries.	2	3	2	1,2,7,12
4.	Enlist the applications of lithium-ion battery.	2	1	2	1,2,7,12
5.	Define glass transition temperature and mention any two factors affecting it.	2	2	3	1,2,7,12
6.	Composites have superior properties over conventional materials. Substantiate.	2	3	3	1,2,7,12
7.	What is octane number? Write its significance.	2	1	4	1,2,7,12
8.	A fuel has the following composition: C=84%. H=5.6%, N=1.2%, S=1.2% and ash=2.2%. Calculate it's HCV and LCV.	2	3	4	1,2,7,12
9.	Define scales and sludges. What are the consequences of their formation in boilers?	2	2	5	1,2,7,12
10.	Mention the permissible degree of hardness, pH, TDS and F <sup>-</sup> ion concentration of potable water.	2	2	5	1,2,7,12
	Part-B $(5 \times 8 = 40 \text{ Marks})$				
11. a)	Derive Nernst equation and calculate the EMF of the zinc - copper cell, if the concentrations of $Zn^{+2}$ and $Cu^{+2}$ are 0.1M and 0.01 M respectively. (Standard electrode potentials of zinc and copper electrodes are -0.77V and 0.34V respectively)	4	3	1	1,2,12
b)	Discuss the construction and working of quinhydrone electrode. Write its merits and limitations.	4	2	1	1,2,12
12. a)	Compute the energy density and power density of a battery weighing 20g which produces 2 amperes current per hour under a potential gradient of 3V.	4	3	2	1,2,7,12
b)	Illustrate the construction and electrochemistry of lead acid storage cell and write its advantages and applications.	4	1	2	1,2,7,12
13. a)	Sketch a neatly labelled diagram and explain the manufacturing of composite materials by resin transfer method.	4	2	3	1,2,7,12
b)	Define degree of polymerization and functionality. Classify polymers based on i) Monomers ii) Backbone of the polymer.	4	3	3	1,2,7,12

culate the amount of air required for the complete combustion of 2kg of a fuel ring the following composition. C=82.5%. H=7.5%, N=2.4%, S=1.4% and =1.8%. plain the chemistry of transesterification and list the advantages of biodiesel. monstrate the principle and procedure of electrodialysis. What are its merits and plications? culate the permanent, temporary, and total hardness of a water sample from the owing data. 100 ml of a standard hard water containing 1gram CaCO <sub>3</sub> per liter,	4 4 4	3	4	1,2,7,12 1,2,7,12 1,2,7,12
monstrate the principle and procedure of electrodialysis. What are its merits and blications? culate the permanent, temporary, and total hardness of a water sample from the owing data. 100 ml of a standard hard water containing 1gram CaCO <sub>3</sub> per liter,	4	1		
culate the permanent, temporary, and total hardness of a water sample from the owing data. 100 ml of a standard hard water containing 1gram CaCO <sub>3</sub> per liter,		1	5	1,2,7,12
owing data. 100 ml of a standard hard water containing 1gram CaCO3 per liter,	4	n á		
asumed 28 ml of EDTA in a complexometric titration. 50 ml of a water sample usumed 36 ml of same EDTA before boiling and 22ml after boiling.		3	5	1,2,7,12
th appropriate model graphs, explain the principle of conductometric i) Strong d Vs strong base ii) Mixture of acids Vs strong base titrations.	4	2	1	1,2,12
etch a neatly labelled diagram and explain the construction and working of osphoric acid fuel cell. Write its advantages.	4	2	2	1,2,7,12
swer any <i>two</i> of the following:	1000000			
ferentiate between addition and condensation polymerization with one example h.	4	3	3	1,2,7,12
plain the conversion of heavy oil in to petrol using fixed bed catalytic cracking thod.	4	2	4	1,2,7,12
th a neatly labeled graph, explain break point chlorination. Mention the rantages.	4	2	5	1,2,7,12
	wer any <i>two</i> of the following: Therentiate between addition and condensation polymerization with one example in. It is the conversion of heavy oil in to petrol using fixed bed catalytic cracking hod. In a neatly labeled graph, explain break point chlorination. Mention the	<ul> <li>wer any <i>two</i> of the following:</li> <li>The rentiate between addition and condensation polymerization with one example</li> <li>4</li> <li>a.</li> <li>a.</li> <li>b.</li> <li>b.</li> <li>b.</li> <li>b.</li> <li>b.</li> <li>b.</li> <li>b.</li> <li>c.</li> <li>c</li></ul>	<ul> <li>wer any <i>two</i> of the following:</li> <li>The rentiate between addition and condensation polymerization with one example</li> <li>and</li> <li>and the conversion of heavy oil in to petrol using fixed bed catalytic cracking</li> <li>b a neatly labeled graph, explain break point chlorination. Mention the</li> <li>and the conversion of the following:</li> </ul>	wer any <i>two</i> of the following: The rentiate between addition and condensation polymerization with one example 4 3 3 h. lain the conversion of heavy oil in to petrol using fixed bed catalytic cracking 4 2 4 hod. h a neatly labeled graph, explain break point chlorination. Mention the 4 2 5

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%

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(1) the Nerros equation and unlation the KME of the Zore - coppose and if the parakentrations of Zn<sup>2</sup> and Cu<sup>2</sup> and 6 W and 6.0. M respectively, (Stand, constraint potentials, of a neural coppose electronic are 20779, and 6.3 [consectively.]

4) Discuss the constance on and and dependent of quintystron, etc. (e.d.). We can a set as finitum.

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> b) Jobban degree of polytics (Laboranet) (motionality, Clearly - Press) Fortament) Richigans with coherent.