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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

First Semester, B.E. - Semester End Examination; April - 2021

Engineering Chemistry

(Common to all Branches)

Time: 3 hrs *Max. Marks: 100*

Course Outcomes

The Students will be able to:

CO1: Aware and Recognize the importance of Chemical fuels and Alternate fuels.

CO2: Describe the construction, working and applications of electrodes, cells, and batteries.

CO3: Apply the knowledge of Chemistry to understand the mechanism and prevention of corrosion. Engineering applications of electro-plating and electro-less plating.

CO4: Synthesis of various polymers and study their applications. Use of cement and lubricants in the field of engineering. Acquiring the knowledge of liquid crystals, nano science, water technology and water pollution.

***Note**: I) **PART - A** is compulsory. **Two** marks for each question.*

*II) **PART - B**: Answer any **Two** sub questions (from a, b, c) for Maximum of **18 marks** from each unit.*

Q. No.		Questions	Marks	BLs	COs	POs
		I : PART - A	**10**			
I	a.	Define cracking.	2	L1	CO1	PO1
	b.	What is single electrode potential and standard electrode potential?	2	L1	CO1	PO1
	c.	Give the reason for electro chemical corrosion.	2	L1	CO1	PO1
	d.	Give the synthesis of Butyl rubber.	2	L2	CO2	PO2
	e.	Write the international standards of drinking water.	2	L1	CO1	PO1
		II : PART - B	**90**			
		UNIT - I	**18**			
1	a.	Define GCV and NCV. Illustrate the experimental determination of calorific value of solid fuel by bomb calorimeter method.	9	L2	CO2	PO2
	b.	Explain reformation of petrol with any three examples. Illustrate the process of knocking.	9	L3	CO3	PO2
	c.	Explain how biodiesel is prepared? Mention the advantages and disadvantages	9	L2	CO2	PO2
		UNIT - II	**18**			
2	a.	What is standard electrode potential? Derive Nernst equation for single electrode potential. Discuss the construction and working of calomel electrode.	9	L1	CO1	PO1
	b.	Differentiate between battery and cell. Explain the construction and working of Ag_2O-Zn battery with applications.	9	L3	CO3	PO2

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c.	Discuss the construction of Li-MnO_2 battery. An electro chemical cell consists of iron electrode dipped in 0.1M $FeSO_4$ and silver electrode dipped in 0.05 M $AgNO_3$. Write the cell representation and cell reactions. Calculate emf of the cell at 298 K. Given that the standard reduction potentials of iron and silver electrodes are −0.44 V and +0.80 V respectively.	9	L3	CO3	PO2
	UNIT - III	**18**			
3 a.	Explain the electrochemical theory of corrosion with reactions. Discuss the galvanization process.	9	L2	CO2	PO2
b.	Outline the following factors affecting on the rate of corrosion: i) pH ii) Temperature iii) Nature of metal iv) Nature of corrosion product	9	L2	CO2	PO2
c.	Mention the technological importance of metal finishing. Discuss the electro less plating of nickel.	9	L1	CO1	PO1
	UNIT - IV	**18**			
4 a.	How are the following polymers are are synthesized? Mention their applications: i) Kevlar ii) Polyurethane iii) Urea formaldehyde	9	L3	CO3	PO2
b.	Illustrate the process of vulcanization and give the preparation of Thiokol rubber.	9	L2	CO2	PO2
c.	Discuss the following properties of cement: i) Soundness ii) Quality iii) shrinkage mentions the functions of lubricants	9	L2	CO2	PO2
	UNIT - V	**18**			
5 a.	Outline boiler scale and sludge. Explain how boiler scales are formed? Mention their ill effects.	9	L2	CO2	PO2
b.	Define COD and BOD. Explain the determination COD of inocstrial waste water experimentally.	9	L2	CO2	PO2
c.	Differentiate lyo-tropic and thermo tropic liquid crystals and summarize the bottom and top down approach of synthesis of nano particles	9	L2	CO2	PO2

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