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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; May - 2022

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 a Maximum of **18 marks** from each unit.*

Q. No.		Questions	Marks	BLs	COs
		I : PART - A	**10**		
I	a.	Define calorific value. Why, HCV is always higher than LCV?	2	L1	CO1
	b.	Distinguish primary cells and secondary cells with example.	2	L1	CO1
	c.	Give reason, why galvanizing is preferred than tinning?	2	L2	CO2
	d.	What is Tg? Mention any two factors affecting on Tg.	2	L2	CO2
	e.	Mention the methods of preventing water pollution.	2	L1	CO1
		II : PART - B	**90**		
		UNIT - I	**18**		
1	a.	Define HCV and LCV. Explain the determination of calorific value of gaseous fuel by Bouy's calorimeter.	9	L2	CO2
	b.	What is meant by knocking? Illustrate the mechanism and ill effects of knocking.	9	L2	CO2
	c.	Explain the following: i) Power alcohol ii) Biodiesel iii) Zone refining of silicon	9	L1	CO2
		UNIT - II	**18**		
2	a.	Derive Nernst equation for electrode potential. Illustrate the determination of p^H of an electrolyte using glass electrode.	9	L1	CO1
	b.	What are primary, secondary and reserve batteries? Explain the construction and working of Ni-MH battery and mention its applications.	9	L2	CO2
	c.	Mention the differences between battery and fuel cells. Describe the construction working and applications of Li-MnO_2 battery.	9	L3	CO3

Contd… 2

UNIT - III **18**

3 a.	Briefly explain the effect of following factors on the rate of corrosion, i) Nature of metal ii) Relative areas of anode and cathode iii) Nature of corrosion product iv) p^H v) Temperature	9	L2	CO2
b.	Explain how corrosion can be controlled by using, proper design and selection of materials.	9	L3	CO3
c.	Describe the electro-less plating of copper on PCB and Nickel.	9	L1	CO1

UNIT - IV **18**

4 a.	Discuss the synthesis and applications of the polymers: i) Polycarbonate ii) Thiokol iii) Epoxy resin	9	L1	CO1
b.	Illustrate the vulcanization and compounding of rubber.	9	L2	CO2
c.	Explain the properties of cement: i) Quality ii) Shrinkage iii) Soundness iv) Setting time v) Colour	9	L3	CO3

UNIT - V **18**

5 a.	Describe the purification of water for town supply.	9	L1	CO1
b.	Summarize the desalination of water by reverse osmosis and electro dialysis methods.	9	L2	CO2
c.	i) What is Nano chemistry? Illustrate the synthesis of nano particles by top down and bottom up process.	5	L1	CO1
	ii) Distinguish between Lyo-tropic and Thermo-tropic liquid crystals.	4	L1	CO1

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