Vivekananda College of Engineering & Technology, Puttur

[A Unit of Vivekananda Vidyavardhaka Sangha Puttur ®]

Affiliated to VTU, Belagavi & Approved by AICTE New Delhi

First Semester B.E Degree Preparatory Examination-April 2022

Dept: BS (CHE)	Sem / Div: I/D,E,F	Sub: Engineering Chemistry	S Code:21CHE12
26/04/2022	Time: 3 hrs	Max Marks: 100	Elective: N

Note: Answer 5 full questions choosing 1 full question from each module.

		MODULE-1	
1	a	Derive Nernst equation for single electrode potential.	7
	b	Distinguish between primary, secondary and reserve batteries.	6
	c	Describe the construction and working of calomel electrode	7
		OR	
2	a	Explain construction and working of glass electrode.	7
	b	Explain the construction, working and applications of Li-ion batteries.	6
	c	Calculate the single electrode potential of Cu electrode at 27°C when the standard potential of Cu is 0.34V and [Cu^{2+}] 0.1M	7
		MODULE-2	
3	a	Describe the electrochemical theory of corrosion taking iron as an example.	7
	b	Distinguish between electro and electroless plating.	6
	c	Explain the factors affecting the rate of corrosion (i) Nature of corrosion product, (ii) Ratio of anodic to cathodic areas.	7
		OR	
4	a	What is cathodic protection? Explain sacrificial anode and impressed voltage methods of cahtodic protection.	7
	b	Calculate the CPR in both mpy and mmpy for a thick steel sheet of area 100 $inch^2$ which experiences a weight loss of 485g after one year. (Density of steel=7.9g/cm^3).	6
	c	Explain: (i) Differential metal corrosion & (ii) Water-line corrosion	7
		MODULE-3	
5	a	What are polymer composites? Explain the synthesis and application of Kevlar fibre.	7

	b	Explain any two size dependent properties of nanomaterials	6
	c	What are Biodegradable polymers? Explain the synthesis properties and applications of Polylactic acid.	7
		OR	
6	a	What are nanomaterials? Explain the synthesis of nanomaterials by precipitation method.	7
	b	Write a note on Fullerenes. Mention properties and applications.	6
	c	Explain the synthesis and application of Polyaniline.	7
		MODULE-4	
7	a	Explain the synthesis of Paracetamol by conventional and green route.	7
	b	Explain the following i) Phase transfer catalyst ii) Solvent free reaction	6
	c	Explain the construction and working of photovoltaic cells.	7
		OR	
8	a	Describe the hydrogen production by photo catalytic water splitting method.	7
	b	Briefly explain any six basic principles of green chemistry.	6
	c	Explain the synthesis of Adipic acid by green and conventional route	7
		MODULE-5	
9	a	Explain the sources and effects of oxides of nitrogen and sulphur	7
	b	Explain the determination of hardness by EDTA method.	6
	c	Explain the theory, instrumentation and applications of flame photometry.	7
		OR	
10	a	Explain the theory and instrumentation of potentiometry	7
	b	$20cm^3$ of an industrial effluent sample required $8.5cm^3$ of 0.05N $K_2Cr_2O_7$ solution. Calculate the COD of the effluent sample	6
	c	Explain the Principle behind the variation of conductance in the following titrations. (a) Strong acid Vs Strong base (b) Mixture of strong acid+ weak acid Vs Strong base	7