PES UNIVERSITY

SRN										

UE15/16CY101

PES UNIVERSITY, BENGALURU

(Established under Karnataka Act 16 of 2013)

END SEMESTER ASSESMENT (ESA) B. Tech. DECEMBER 2020

UE15/16CY101 – ENGINEERING CHEMISTRY

Duration: 3 HOURS	Answer all questions	Maximum Marks: 100

1.	a	Draw a neat labeled phase diagram of water system; clearly indicate the triple point and critical point. Calculate the degree of freedom at the triple point.		6
	b	Explain how phase rule is applied to two component system give example		4
	c	State Franck-Condon principle and Born Oppenheimer approximation		6
	d	What are hot bands and why real molecules do not obey simple harmonic oscillator model?		4
2	a	Derive Nernst equation for single electrode potential.		6
	b	Write a note on Origin of single electrode potential:		4
	c	Discuss types of electrodes with suitable examples		6
	d	Calculate the EMF of the cell $Fe_{(s)}$| $FeSO_4$(0.01M) || $AgNO_3$(0.1M) | $Ag_{(s)}$ at 298 K, if SRPs of Fe and Ag are -0.44 V and 0.8 V respectively		4
3	a	Discuss the following battery characteristics. (i) Capacity (ii) Shelf life.		4
	b	Explain the construction working and application of Nickel-metal hydride battery		6
	c	Differences between a battery and a fuel cell.		4
	d	Describe the construction, working and application of CH_3OH-O_2 fuel cell.		6
4	a	Discuss how the following factors affecting corrosion: 1. Nature of the corrosion product (ii) pH		4
	b	Explain differential metal corrosion with suitable two examples.		6
	c	In electroplating of chromium 1.Mention the composition of plating bath 2. Justify why chromium anode is not used 3. Application of Chromium plating		4
	d	What do you mean by Hard water? Calculate total hardness of water in terms of ppm of $CaCO_3$ in which sample containing: magnesium bicarbonate = 90.0 mg/dm^3; calcium bicarbonate = 20.2 mg/ dm^3, Magnesium chloride = 25.0 mg/ dm^3, calcium chloride = 35.0 mg/ dm^3 and sodium chloride = 12.80 mg/ dm^3. (Given: Atomic weight of Mg = 24, Ca = 40, Cl = 35.5, C = 12, H = 1, O = 16, Na = 23).		6
5	a	Distinguish between Additional and Condensation polymerization.		4
	b	Give the synthesis, properties and application of butyl rubber		6
	c	Write the formula for the following: 1. Number average molecular weight 2. Weight average molecular weight, 3. Viscosity average molecular weight.		6
	d	Mention the any four principles of green chemistry		4

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