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10CHE12/22

First/Second Semester B.E. Degree Examination, June/July 2018

		Engineerin	g Chemistry			
Time	e: 3	hrs.		Max. Marks:100		
		Note: Answer any FIVE full question	s, choosing at least two from	each part.		
		PAR	$\mathbf{A}\mathbf{T} - \mathbf{A}$			
1	a.	Choose the correct answers for the follow		(04 Marks)		
		i) A redox reaction taking place in a g		D) M C.I		
			ntaneous C) Irreversible	D) None of these		
		ii) When the concentration of chloride potential of the electrode.	e ions in calomet electrode dec	reases, the reduction		
		A) Increases B) Decreases	c) Does not alter	D) Becomes zero		
		iii) An ion selective electrode used in t		,		
		A) Calomel electrode	B) Silver-Silver chlor	ride electrode		
		C) Glass electrode	D) None of these			
		iv) The standard reduction potential o		are 0.34 and 0.80 V		
		respectively. The emf of the cell fo		D) 104 V		
1	h	A) 1.14 V B) 0.46 V	C) 1.26 V	D) 1.94 V (04 Marks)		
	b. c.	Give the differences between a galvanic Explain the construction and working of		(04 Marks)		
2 (15)		(i) Silver – Silver chloride electrode				
		(ii) Glass electrode.		(06 Marks)		
	d.	Define single electrode potential. Calcu	alate the potential of Ag-Zn of	ell at 298 K, if the		
		concentrations of Ag ⁺ ions and Z_n^{2+} ions are 5.2×10^{-2} m and 1.3×10^{-2} m respectively. Given				
		$E_{A_{\sigma}/A_{\sigma}^{*}}^{\circ}=0.80~V~\text{and}~E_{Z_{n}/Z_{n}^{2+}}^{\circ}=-0.76~V$		(06 Marks)		
		$-\Delta_{\rm g}/\Delta_{\rm g}^*$ $-Z_{\rm n}/Z_{\rm n}^{2+}$		3.2		
2	a.	Choose the correct answers for the follow		(04 Marks)		
		i) In a rechargeable battery the net ce		~~~		
		A) Irriversible B) Reversible		D) None of these		
		ii) The cathodic material of lead-acid		D) DL		
		A) Pb ₃ O ₄ B) PbO	C) PbO ₂	D) Pb		
		iii) The electrolyte used in Zn-Air cell		D) KOH		
		A) H ₂ SO ₄ B) HCl	C) KCl	D) KOH		
		iv) Super capacitors are also referred t		ritar		
		A) Electrical layer capacitorC) Electrical double layer capacito	B) Single layer capac	attor		
	b.	What are fuel cells? Distinguish between		(05 Marks)		
	c.	Describe the construction and the working		(06 Marks)		
	d.	Describe the construction and working of		(05 Marks)		
3	a.	Choose the correct answers for the following	wing:	(04 Marks)		
	и.	i) If Iron is coated with Zinc, which is				
		A) Iron B) Zinc	C) Both Iron and Zinc	D) None of these		
		ii) A steel water tank is half filled w	ith water for storage, which po	rtion of the tank gets		
		corroded in due course of time.	D) A1			
		A) Below the water line	B) Above the water	ine		
		C) Entire area of the tank The flux used in Galvanizing is	D) No corrosion			
		iii) The flux used in Galvanizing is, A) NH ₄ Cl B) BaCl ₂	C) NaCl	D) Palm oil		

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			Caustic embrittlement is an example of, A) Galvanic corrosion C) Stress corrosion	B) Water line corros D) None of these	ion
	b.	Disci (i) (ii)	Nature of corrosion product and pH	the rate of corrosion:	(04 Marks)
	c. d.	Disci	uss: (i) Galvanic corrosion and (ii) Pittin ain the following methods of control of cor	g corrosion rosion:(i) Phosphating a	(06 Marks) and (ii) Tinning (06 Marks)
	a.	Choc	ose the correct answers for the following:		(04 Marks)
		i)	For an electrolytic mixture containing Z	$C_{\rm u}^{2+}, C_{\rm u}^{2+}, A_{\rm g}^{+} \text{ ions, wh}$	nich ion going to be
			discharged first is,		
			A) Z_n^{2+} B) C_u^{2+}	$C)$ A_g^+	D) Z_n^{2+} and C_u^{2+}
		ii)	In electroplating the article to be plated is		
		,	A) Increase the rate of plating	B) Get a bright depo	osite
			C) Remove grease	D) Remove oxide sc	aling
		iii)	In an electrolytic cell, anode of the cell is,		- D
			A) -ve B) +ve	C) No change	D) ±
		(iv)	The double sided printed circuit board is r	nanufactured by using t	the process,
		1	A) Electroforming B) Phosphating C) Electroplating D) E	d electroless plating
	b.	Wha	at is electroplating? Give the differences bet	ween electroplating and	(04 Marks)
	c.	Give	e a brief account of the following plating pr	ocesses:	
		(i)	Electroplating of chromium and		
		(ii)			(06 Marks)
	d.	Exp	lain the effect of following factors on the na	ature of electrodeposite:	
		(i)	2115 W 11	nd (iii) Brightr	ners (06 Marks)
			PART – B		
5	a.	Cho	ose the correct answers for the following:		(04 Marks)
		i)	A reference mixture used to find the octain	ne number of gasoline is	s,
			A) Isooctantane-Pentane	B) Isooctane-Butan	ne
			C) Isooctane-Heptane	D) Isooctane-Hexa	ne
		ii)	Power alcohol is a belnded mixture of gas		D) Mathamal
			A) Butanol B) Ethanol	C) Propanol	
		iii)	A renewable fuel obtained from a variet	y of agricultural resour	ces such as soy beans
			or rapeseeds is known as, A) Biopetrol B) Diesel	C) Biodiesel	D) Biogas
		iv)	Photovoltaic cell consists of,	C) Blodleser	D) Blogue
		14)	A) P-n junction B) n-type junction	C) P-junction	D) None of these
	b.	Wh	at is reforming? Explain the reactions occur		
	C.	Wh	at is a photovoltaic cell? Explain its constru	action and working.	(05 Marks)
	d.	Def	fine the terms GCV and NCV. Calculate	the gross and net cal-	orific value of a coal
			pple from the following data:		
		(i)	Weight of coal = 0.65 kg	t toor or an a	
		(ii)	Weight of water taken in calorimeter =		
		(iii)		ag .	
		(iv)			
		(v)			
		(vi)			(07 Marks)
		(vii	2 o		(U/ Marks)
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	a.	Cho	ose the correct answers for the following:	Jer, India	(04 Marks)
		i)	Reduced phase rule for two component sy	ystem is,	
			A) $P + F = C + 3$	(B) $P + F = C - 2$	
			C) $P+C=F+1$	D) $P + F = C + 1$	
				(\mathcal{D}) (\mathcal{D})	
		ii)	Pb-Ag system is a case of,		N F
			A) One component B) Two component	C) Three component L) Four component
		iii)	The number of phase that coexist in the e	quilibrium at tripple poir	nt in water system,
			A) 0 B) 1	C) 2	D) 3
		iv)	In potentiometric redox titrations the refe	erence electrode used is.	
		11)	A) SHE B) Calomel electrode	C) Glass electrode	D) None of these
	1.	D		· ·	(05 Marks)
	b.	Drav	w and explain the phase diagram of Lead-S	Silver system.	(05 Marks)
	C.	Defi	ne the following terms: Give one example	e for each,	
		(i)	Phase		
		(ii)	Component		
		(iii)	Degrees of freedom		(06 Marks)
	d.	State	e Beer-Lambert's law. Explain how this la	w can be used to determ	nine the concentration
	u.		oloured solution.		(05 Marks)
		01 00	blouted solution.		(00 ///////////////////////////////////
					(04 Mayles)
	a.	Cho	ose the correct answers for the following:		(04 Marks)
		(i)	An example of thermoshetting plastic is,		
			A) PVC B) Teflon	C) PMMA	D) Backelite
		ii)	Which of the following is essential for a	conducting polyer:	
			A) Linear structure	B) Branched structu	re GRA
			C) Conjugated double bonds	D) None of these	
		,	The process of heating a rubber with sulp		
		iii)		C) Combustion	D) None of these
			A) Sulphonation B) Vulcanization		15) None of these
		iv)	The trade name of polytetrafluoroethyler	ne is,	D) N C4l
			A) Plexiglass B) Buna-S	C) Teflon	D) None of these
	b.	Giv	e the synthesis and applications of, (i) Tef	lon and (ii) Neoprene.	(06 Marks)
	C.	Wh	at is polymerization? Explain addition an	d condensation polymer	ization with example.
					(05 Marks)
	d.	Wh	at are conducting polymers? Explain the m	nechanism of conduction	in polyacetylene.
		1111			(05 Marks)
0	0	Cho	oose the correct answers for the following	:x	(04 Marks)
)	a.	2)	The reagent used in colorimetric determ	ination of fluoride conter	nt in water is.
		1)		C) K,CrO ₄	D) H_2SO_4
			A) PDA B) SPADNS		
		ii)	In the activated sludge process of sewag	ge treatment the impuritie	es are oxidized by,
			A) Potassium dichromate	B) Ozone	
			C) Aerobic bacteria	D) None of these	
		:::)	Alkalinity in water is not due to,		
		iii)		C) CO	D) HCO ₃
			A) H ⁺ B) OH	C) CO ₃	D) HCO3
		iv)	Temporary hardness of water is due to,		
			A) CaCO ₃ B) MgCO ₃	C) $Ca(HCO_3)_2$	D) CaCl ₂
	b.	Evi	plain argentometric method of determination		water. (05 Marks)
		UI	net is described by Evnlain description of	water by electrodialysis.	(06 Marks)
	c. What is desalination? Explain desalination of water by electrodialysis.d. Define the terms BOD and COD. Calculate the BOD value of a sewage sample.				
	d.	De	Time the terms BOD and COD. Calculate	O (C = 12 U = 1 and	O = 16) (05 Marks)
		9.2	mg/l of organic matter with formula C ₆ H ₁	$_{12}O_{6}$. (C - 12, H - 1 and	(US Marks)

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