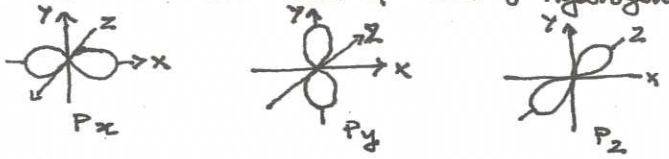
SCHEME OF VALUATION

(Scoring Indicators)

Revision: 2015 Course Code : 2004

Course Title: Engineering Chemistry - II

Qst. No		Scoring Indicator	Split up score	Sub Total	Total
		PART - A			
I	1.	Na - $1s^2\ 2s^2\ 2p^6\ 3s^1$.	1	2	2
		Ca - $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2$.	1		
	2.	$n = 4$	1	2	2
		$l = 3$	1		
	3.	Strong Electrolytes : HCl, NaOH	1	2	2
		Weak Electrolytes : CH_3COOH, NH_4OH	1		
	4.	Free from electromagnetic interference	1	2	2
		large amount of information transmitted over longer distances.	1		
	5.	H_2SO_4	1	2	2
		HNO_3	1		
		PART - B			
II.	1.	a). Explained the stability of atom.	1½	3	6
		Explained the line spectra of hydrogen	1½		
		b). 	1+1+1	3	
	2	a). Octet rule : Atoms of different elements combine with each other to complete eight electrons in their valance shell.	1½	3	6
		Explanation using NaCl or any other example.	1½		
		b). Ca - 2, 8, 8, 2 . F - 2, 7	1	3	
		Ca loses two electrons to form Ca^{2+} and the two electrons are accepted by two F atoms.	1		
		Ca^{2+} and two F^- ions are attracted by strong electrostatic force of attraction to form CaF_2	1		
	3.	a). Definition of Faraday's first law	1	3	
		$W = Z Q$, Z = Electrochemical equivalent	1		
		Electro chemical equivalent is the mass of substance deposited by the passage of one coulomb electricity.	1		

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Course Title: Engineering Chemistry - II

Ost. No	Scoring Indicator	Split up score	Sub Total	Total
	b). In a Daniel cell, Zinc rod dipped in $ZnSO_4$, Copper rod dipped in $CuSO_4$, the electrodes are connected by a wire and the half cells connected by a salt bridge OR Diagram.	1		6
	At Anode, $Zn \rightarrow Zn^{2+} + 2e^-$	1	3	
	At cathode, $Cu^{2+} + 2\bar{e} \rightarrow Cu$			
	Net reaction, $Zn + Cu^{2+} \longrightarrow Zn^{2+} + Cu$.	1		
4.	a) $E_{cell} = E_{Cathode} - E_{Anode}$	1½		
	$E_{cell} = 0.84 - 0.34 = 0.50V$	1½	3	
	b) 1. Copper gets deposited on iron and the solution becomes green due to formation of $FeSO_4$	1½		6
	2. Silver gets deposited on copper and the solution becomes blue due to formation of $Cu(NO_3)_2$	1½	3	
5.	a) Unsaturated compounds decolourises yellow bromine water.	1½		
	Unsaturated compounds decolourises alkaline $KMnO_4$ (Bayer's reagent).	1½	3	6
	b) Catenation.	1		
	Strengths of C-C bond	1	3	
	Multiple bonding OR Any three properties	1		
6.	a) i) Tetrafluoroethene.	1		
	ii) Vinyl chloride	1	3	
	iii) Isoprene OR 2-methyl-1,3-butadiene	1		
	b) Addition polymers are formed by repeated addition of monomer molecules having double or triple bonds.	1		6
	Any one example	½	3	
	Condensation polymers are formed by repeated condensation of two different bifunctional or tri-functional monomer units.	1		
	Any one example	½		

SCHEME OF VALUATION

(Scoring Indicators)

Revision: 2015 Course Code : 2004.

Course Title: Engineering Chemistry-I

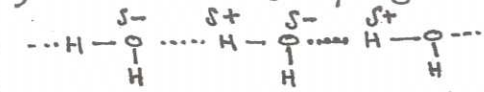
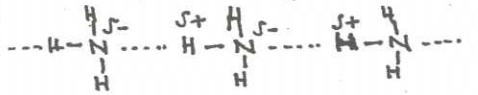
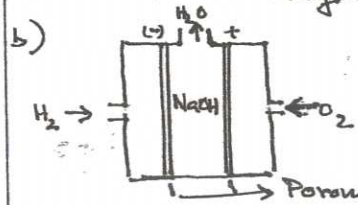
Ost. No	Scoring Indicator	Split up score	Sub Total	Total
7	a) i. Water gas : Mixture of CO and H_2.	1½	3	6
	ii. Producer gas : Mixture of CO and N_2.	1½		
	b) Nuclear fuels are abundant power sources as it releases energy of the order of mc^2. It is an alternative source because the conventional sources of power such as oil, coal etc. are limited	2	3	
	$^{238}_{U}$, $^{235}_{U}$ or any other examples	1		
	PART - C			
	UNIT - I			
III	a) The concepts of orbits, stationary states, quantisation of energy, $\Delta E = E_2 - E_1$, frequency $\nu = \Delta E/h$ and $mvr = nh/2\pi$.	1+1+1+1+1	5	15
	b) $\lambda = \frac{h}{mv}$	2	5	
	$m = 0.1\ kg$ and $v = 10\ m\ s^{-1}$, $h = 6.626 \times 10^{-34}\ kg\ m^2\ s^{-1}$	2		
	$\lambda = \frac{6.626 \times 10^{-34}\ kg\ m^2\ s^{-1}}{0.1\ kg \times 10\ m\ s^{-1}} = 6.626 \times 10^{-34}\ m$	1		
	c) $m = \frac{h}{4\pi . \Delta x . \Delta v}$	2	5	
	$\Delta x = 10^{-8}\ m$, $\Delta v = 10^{4}\ m\ s^{-1}$, $h = 6.626 \times 10^{-34}\ kg\ m^2\ s^{-1}$	2		
	$m = \frac{6.626 \times 10^{-34}\ kg\ m^2\ s^{-1}}{4 \times 3.14 \times 10^{-8}\ m \times 10^{4}\ m\ s^{-1}} = 5.275 \times 10^{-31}\ kg$	1		
	OR			
IV	a) Definition or Explanation of covalent bonding.	1	5	
	$:\ddot{O}: + :\ddot{O}: \rightarrow :\ddot{O}::\ddot{O}:$ OR $:\ddot{O}=\ddot{O}:$	2		
	$:N: + :N: \rightarrow :N::N:$ OR $:N\equiv N:$ with explanation.	2		
	b) Definition or Explanation of coordinate bond.	1	5	
	$H-\underset{H}{\overset{H}{N}}: + H^+ \rightarrow \left[H-\underset{H}{\overset{H}{N}}\rightarrow H\right]^+$ with explanation.	2		
	$H-\underset{H}{\ddot{O}}: + H^+ \rightarrow \left[H-\underset{H}{\ddot{O}}\rightarrow H\right]^+$ with explanation	2		

SCHEME OF VALUATION

(Scoring Indicators)

Revision: 2015 Course Code : 2004.

Course Title: Engineering Chemistry - II

Ost. No	Scoring Indicator	Split up score	Sub Total	Total
	c) Definition of Hydrogen bond	1		
	 with explanation	2	5	
	 with explanation	2		
	UNIT - II			
V	a) Conductor	1¼	5	
	Insulator	1¼		
	Semi conductor	1¼		
	Super conductor	1¼		
	Explanation with one example for each.			
	b) Molten NaCl: $Na^+ + \bar{e} \rightarrow Na$ (Cathode)	2		
	$2Cl^- \rightarrow Cl_2 + 2\bar{e}$ (Anode)			
	Sodium deposited at cathode and Cl_2 liberated at anode	½	5	15
	Aqueous NaCl: $H^+ + \bar{e} \rightarrow H \cdot 2H \rightarrow H_2$ (Cathode)	2		
	$2Cl^- \rightarrow Cl_2 + 2\bar{e}$ (Anode)			
	H_2 liberated at cathode and Cl_2 liberated at anode	½		
	c) Electroplating, Refining of metals, Electrometallurgy, Manufacture of chemicals, Determination of eq. masses OR any five applications.	1 mark for each	5	
	OR			
VI.	a) Maintaining purity of metal, Preparation of alloys, Barrier protection, Cathodic protection, Anti rust solution OR Any five methods.	1 Mark each	5	
	b) 	1		
	Anode: $2H_2 + 4OH^- \rightarrow 4H_2O + 4\bar{e}$	1	5	
	Cathode: $O_2 + 2H_2O + 4\bar{e} \rightarrow 4OH^-$	1		
	OR $2H_2 + O_2 \rightarrow 2H_2O$ + Energy			
	Advantages: High efficiency, No pollution OR Any two Advantages.	2		

SCHEME OF VALUATION

(Scoring Indicators)

Revision: 2015 Course Code : 2004.

Course Title: Engineering Chemistry-II

Ost. No	Scoring Indicator	Split up score	Sub Total	Total
	c) Definition of Corrosion	2		15
	One portion of iron act as anode and another act as cathode.	1	5	
	Fe oxidised to Fe^{2+} and forms $Fe(OH)_2$ and $Fe(OH)_3$.	1		
	$Fe(OH)_3$ becomes rust with formula $Fe_2O_3 \cdot x H_2O$	1		
	UNIT - III			
VII.	a) Any five important differences between organic and inorganic compounds.	1 mark for each	5	
	b) Definition of refractory material	1		
	One Example : Alumina bricks or Silica refractories	1	5	
	Properties : Refractoriness, Thermal spalling, Porosity. OR Any three properties.	3		15
	c) Glass is an amorphous, hard, brittle, transparent super cooled liquid of infinite viscosity. A mixture of number of silicates.	2	5	
	Different Types : Soda glass, with explanation. Pyrex glass, with explanation. Safety glass, with explanation.	3		
	OR Any three types of glass with proper explanation.			
	OR			
VIII.	a) Homopolymer - Definition	1 1/2		
	Any two examples	1	5	
	Co polymer - Definition.	1 1/2		
	Any two examples	1		
	b) Thermoplastic - Definition	2		
	PVC or Any other example.	1 1/2	5	15
	Thermosetting plastic - Definition	2		
	Bakelite or Any other example	1/2		

SCHEME OF VALUATION

(Scoring Indicators)

Revision: 2015 Course Code : 2004 .

Course Title: Engineering Chemistry - II

Ost. No	Scoring Indicator	Split up score	Sub Total	Total
	c) Vulcanisation is the process of heating raw rubber with sulphur at 373 - 415K. Sulphur forms cross links at the reaction sites of double bonds.	3	5	
	Merits : Increases resistance to abrasion. Increases elasticity OR Any two merits	2		
	UNIT - IV			
IX.	a) High calorific value, Moderate velocity of combustion Moderate ignition temperature, low moisture content, low non-combustible matter OR Any five characteristics.	1 Mark each	5	—
	b) Process of breaking up of less volatile bigger hydrocarbon molecules from petroleum to more volatile lower molecules.	2	5	15
	Thermal cracking : Oil subjected to high temperature pyrolysis at high pressure.	1½		
	Catalytic cracking : Heating is done at a lower temperature in presence of catalyst	1½		
	c) Petroleum : Its origin, mining, refining etc.	2	5	
	Gasoline - Important hydrocarbons present such as pentane to octane.	1		
	Diesel - Important hydrocarbons present such as $C_{15}H_{32}$ to $C_{18}H_{38}$.	1		
	Kerosene - Important hydrocarbons present such as $C_{10}H_{22}$ to $C_{16}H_{34}$. OR	1		
X.	a) Formation of oxides of N and S. Conversion of NO_2 and SO_2 into HNO_3 and H_2SO_4	2	5	15
	Consequences : Corrosion of metals			
	Damage to crops & buildings.	3		
	Acidification of soil or any Three consequences.			
	b) Green House effect : Trapping of solar energy by green house gases such as CH_4, O_3, CFC etc.	1½		
	Any one consequence.	1	5	
	Ozone depletion : O_3 and its importance	1½		
	Effect of CFC and ozone hole formation.	1		

SCHEME OF VALUATION

(Scoring Indicators)

Revision: 2015 **Course Code:** 20004,

Course Title: Engineering Chemistry-II

Ost. No	Scoring Indicator	Split up score	Sub Total	Total
	c) Green Chemistry: Idea of reducing chemical hazard to environment by proper design, development and implementation of chemical process. Use of less toxic products, maintain good atom economy, improve energy efficiency, use of renewable raw material etc.	3	5	
	Application.			
	use of H_2O_2 in paper industry.	2		
	Use of liquid CO_2 in dry cleaning. OR any two important applications.			