Question Paper

Marks: 100

Exam Date & Time: 23-Apr-2018 (09:30 AM - 12:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES SECOND SEMESTER B.Sc (APPLIED SCIENCE) END-SEMESTER THEORY EXAMINATIONS APRIL - 2018 DATE: 23 APRIL 2018 TIME: 9:30AM TO 12:30PM Chemistry [ICH 121]

Duration: 180 mins.

Answer 5 out of 8 questions

	134401	s out of a questions.	
1)	A)	Explain the construction and working of Electrolytic cell. Write four differences between galvanic and electrolytic cell.	(8)
	B)	What is hybridization? Explain sp ² and sp hybridizations with a suitable example.	(8)
	C)	The gaseous reaction $A+B\Box$ C+D is studied in a one liter vessel at 250°C. The initial concentration of A is three	(4)
		times the initial concentration of B. After equilibrium is attained, the concentration of C is found to be equal to the concentration of B. Calculate the equilibrium constant of the reaction.	
2)	A)	Define law of mass action. Obtain the mathematical expression for equilibrium constant. Derive the relationship between K_c and K_p .	(8)
	В)	Derive a relationship between hydrolysis constant, ionic product of water and the dissociation constants for the hydrolysis of ammonium chloride and sodium acetate.	(8)
	C)	What is hydrogen bonding? Explain intra molecular and inter molecular hydrogen bonding.	(4)
3)	A)	What is meant by salt hydrolysis? Discuss with a suitable example four types of hydrolysis of salt.	(8)
	В)	Explain the following: a) Resonance b) Electron sea model of metallic bonding c) Octet rule	(8)

d) Lattice energy

	C)	The emf of a cell, Mg Mg ²⁺ (0.01 M) Cu ²⁺ (1.0 M) Cu, is	(4)
		measured to be 2.78V at 298K. The standard electrode potential of magnesium electrode is -2.37 V. Calculate the electrode potential of Copper electrode. Write the cell reactions.	
4)	A)	What are alkenes? Explain the IUPAC rules for naming Alkenes with suitable examples.	(8)
	В)	Explain the Homolytic fission and Heterolytic fission of organic compounds with suitable examples. Discuss the stability of carbanion.	(8)
	C)	Draw the structural formula of the following molecules i) 4-Penten-2-ol ii) Hexan-3-one iii) 5-Methyl-2-nitrohexane iv) 3-Penten-1-yne	(4)
5)	•	Discuss the band theory to explain the bonding in lithium metal.	(8)
	B)	What is a standard cell? Explain the construction and working of Weston Cadmium cell.	(8)
	C)	Define order and molecularity of a reaction. Give examples.	(4)
6)	A)	Write different types of orbital overlapping according to VB theory with an example in each case. Draw the molecular orbital diagram for N_2 and predict the bond order and its magnetic behaviour.	(8)
	В)	Derive an expression for the rate constant of a first order reaction. Explain factors influencing the rate of chemical reaction	(8)
	C)	 Give reason: i) Metals are malleable and ductile. ii) The molecular ion H₂²⁻ does not exist. iii) The dipole moment of water is 1.84D while that of Carbon dioxide is zero. 	(4)
		iv) Boiling point of ammonia is higher than that of phosphine.	
7)	A)	With a neat diagram, explain the construction and working of the glass electrode.	(8)
	B)	What are second order reactions? Derive the expressions	(8)

for the rate constant of second order reaction i) having only one reactant and ii) having two different reactants.

^{C)} Calculate the degree of hydrolysis of 1/100 molar solution ⁽⁴⁾ of sodium acetate at $250^{\circ}C$ if the hydrolysis constant of

sodium acetate at 250° C is 5.76 x 10^{-10} .

⁸⁾ Define the heat capacity of a system. Obtain the ⁽⁸⁾ (8) expression for heat capacities at constant volume and constant pressure for one mole of an ideal gas. Show that for an ideal gas Cp-Cv = R.

^{B)} Define:

i) Extensive property

ii) Homogeneous system

iii) State of a system

iv) Isothermal process

^{C)} The enthalpies of formation of water and carbon dioxide ⁽⁴⁾ are -286.2 KJ and -393.5 KJ respectively. If the enthalpy of combustion of benzene is -3267.7 KJ calculate the enthalpy of formation of benzene.

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(8)