B.Tech 1st Year 1st Semester
Second Unit Test, November 2017
CHEMISTRY 1 [CH 101]

Set-1

(Students are requested to write down the SET No. in their Answer sheet)

Time allotted: 40 minutes **Full marks: 15**

Group A

Answer any **Ten** of the following T**welve** questions **(10 X 0.5 = 5)**

1. (i) At inversion temperature, Joule Thomson co-efficient is

a) Zero b) Positive

c) Negative d) None

(ii) When ice melts into water, entropy

a) becomes zero b) remains same

c) Increase d) Decrease

(iii) Which of the following is an iso-entropic process?

a) Isobaric b) Isochoric

c) Adiabatic d) Isothermal

(iv) What is the hybridization of the carbon atoms in 1-Butene?

a) sp^3 and sp^2 b) sp^2 and sp

c) sp^3 and sp d) sp^3 only

(v) In which of the following compounds hyper conjugation is observed?

a) CH_3Cl b) $(CH_3)_3C–CH=CH_2$

c) CH_3-$CH=CH_2$ d) $CH_2=CHCl$

(vi) Most commonly used polyester is known as

a) Terylene b) Nylon

c) Fat d) Protein

(vii) Bakelite is obtained from phenol by reacting with

a) HCHO b) $(CH_2OH)_2$

c) CH_3CHO d) CH_3COCH_3

(viii) Polymers which cannot be recycled are known as

a) Thermoplasts b) Thermosets

c) Elastomers d) Fibre

ix) Which is not a polymer?

a) Sucrose b) Enzyme

c) Starch d) Teflon

x) The Cell reaction is spontaneous if the cell potential is

a) Zero b) Negative

c) Positive d) Infinite

xi) Which one of the following is not a Primary fuel?

a) Wood b) Coke

c) Natural gas d) Crude oil

xii) Suitability of a Diesel fuel is determined by

a) Octane number b) Cetane number

c) Carbon percentage d) None

Group B

Answer the following questions (***Any Two***) **5 X 2 = 10**

2. (a) Define Heat of Neutralization.

(b) Show that Joule Thomson effect is an isoenthalpic process.

(c) Calculate the entropy change in heating 7 gm of Nitrogen from 300 to 500 K at constant Volume. [C_V = 5cal / mole] 1 + 2 + 2 = 5

3. (a) Distinguish between Inductive effect and Mesomeric effect.

(b) Explain the mechanism of S_N1 reaction with an example mentioning the key features of the reaction. 2 + 3 = 5

4. (a) What is tacticity? Classify the polymer based on its tacticity.

(b) What is addition polymerization? By taking an example, describe the steps involved in addition polymerization. 2½+2½ = 5

5. (a) For a Cell $Zn \mid Zn^{+2}(aq) \parallel Cu^{+2}(aq) \mid Cu$,

$Cu^{+2} + 2e \rightarrow Cu \quad E^0 = +0.35V$; $Zn^{+2} + 2e \rightarrow Zn \quad E^0 = -0.763V$

(i) Write down the Cell reaction (ii) Calculate the E^0 of the Cell

(b) Name the major fractions obtained from the refining of Crude Petroleum. Mention their Boiling Ranges & Applications. 2 + 3 = 5

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Set-2

(Students are requested to write down the SET No. in their Answer sheet)

Time allotted: 40 minutes **Full marks: 15**

Group A

Answer any **Ten** of the following T**welve** questions **(10 X 0.5 = 5)**

1. (i) The Joule Thomson expansion is

a) isobaric b) isothermal

c) isoentropic d) isoenthalpic

(ii) A spontaneous reaction is impossible if

a) both ΔH and ΔS are positive b) ΔH is positive and ΔS is negative

c) both ΔH and ΔS are negative d) ΔH is negative and ΔS is positive

(iii) For a reaction C→D, both change in enthalpy and entropy are positive. The most favorable condition for the reaction is

a) low temperature b) low pressure

c) high pressure d) high temperature

(iv) What is the hybridization of PCl_5?

a) sp^3 b) sp^2

c) sp^3d d) sp^3d^2 only

(vi) Which of the following compounds shows highest rate of S_N1 reaction?

a) $(CH_3)_2CHCl$ b) $(CH_3)_3CCl$

c) CH_3Cl d) CH_2=CHCl

(vii) Identify the co-polymer among the following polymers.

a) SBR b) Teflon

c) HDPE d) Polystyrene

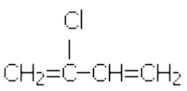
(viii) Identify the natural polymer

a) Urea formaldehyde resin b) Styrene butadiene rubber

c) Cellulose d) Nylon 66

(ix) Which of the followings monomers gives the polymer neoprene on polymerization?

a) $CH_2 = CHCl$ b) $CCl_2 = Cl_2$

c)  d) $CF_2 = CF_2$

(x) Stronger the Oxidizing agent, greater the

a) Oxidation potential b) Reduction potential

c) Ionic behavior d) None

(xi) Which of the following possesses Octane rating of 100?

a) Petrol b) LPG

c) Isooctane d) None

(xii) The main constituent of natural gas is

a) butane b) methane

c) carbon monoxide d) hydrogen

Group B

Answer the following questions (***Any Two***) **5 X 2 = 10**

2. (a) Define Heat of formation.

(b) Prove that $(\frac{\partial G}{\partial P})_T$ = V and $(\frac{\partial G}{\partial T})_P$ = –S

Where G is Gibb's Free energy and S is entropy.

(c) The available heat from burning a fuel is 8000 cal/gm. What is the maximum work available from it when the engine works between the BP of water and 30°C. What is the efficiency? 1 + 2 + 2 = 5

3. (a) Distinguish between Inductive effect and Electromeric effect.

(b) Explain the mechanism of S_N2 reaction with an example mentioning the key features of the reaction. 2 + 3 = 5

4. (a) Give the mathematical expression of Number average and Weight average molecular weight of a polymer. Explain the polydispersity index (PDI)

(b) The degree of polymerization is 990. Find out the molecular weight of polyethylene

3 + 2 = 5

5.(a) For the following Cell , write down the cell reaction & calculate the EMF at 25^0 C.

(i) Ag | Ag^+ (a = 0.1) || Zn^{+2} (a = 0.1) | Zn

(ii) E^0 Ag^+ / Ag = 0.799V & E^0 Zn^{+2} / Zn = - 0.763V

(b) What is cracking & mention its importance? Distinguish between Thermal and Catalytic Cracking? 2 + 3 = 5