Total No. of printed pages = 7

END SEMESTER EXAMINATION – 2019

Semester : 4th (New)

Subject Code : Ch-401

APPLIED CHEMISTRY

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Instructions :

1. *All* questions of PART–A are compulsory.
2. Answer any *five* questions from PART–B.

PART – A

Marks – 25

1. Fill in the blanks : 1×10=10

(a) Work is a _____ function.

(b) In adiabatic process, there is no exchange of _____ with surrounding.

[Turn over

(c) Working substance in Carnot heat engine is _____ gas.

(d) Unit of rate constant of 1st order reaction is _____.

(e) Catalyst reduces _____ energy of a chemical reaction.

(f) On dilution, conductivity of a solution _____.

(g) When liquid is dispersed in liquid, the colloidal system is called _____.

(h) Osmotic pressure of colloidal system is _____.

(i) Inductive effect is a _____ effect.

(j) Primary alcohol and ethers are _____ isomers.

2. Write true or false for the following statements : $1 \times 10 = 10$

(a) Viscosity is an intensive variable.

(b) Entropy of a natural process always decreases.

(c) The rate law is determined experimentally only.

(d) Half life of a 1st order reaction is independent of temperature.

(e) pH of 1 molar H_2SO_4 and 1 normal H_2SO_4 is equal.

(f) Absorption is a bulk phenomenon.

(g) Heterogeneous catalysts are also known as surface catalyst.

(h) Electrophoresis is a property related to True solution.

(i) Secondary alcohols on Oxidation give acids with same number of carbon atoms.

(j) Both benzene and toluene are aromatic hydrocarbons.

3. Choose the correct answer : 1×5=5

(a) Free radicals are produced from

(i) Homolytic fission

(ii) Heterolytic fission

(iii) Catalytic cracking

(iv) Elimination reaction

(b) Benzene is a polymer of

(i) Ethene (ii) Ethyne

(iii) Methane (iv) Cyclohexane

(c) Nitriles on acid hydrolysis form

(i) alcohol (ii) ether

(iii) carboxylic acid (iv) ester

(d) Buffer solution is a

(i) colloidal solution

(ii) acid solution

(iii) alkali solution

(iv) mixture of two solutions

(e) In Victor Mayer test, Primary alcohols give

(i) red colour

(ii) blue colour

(iii) yellow colour

(iv) black colour

PART – B

Marks – 45

4. (a) What is Enthalpy of formation ? Enthalpy of formation of $SO_2(g)$ is –296.9 KJ. What is the enthalpy of dissociation of $SO_2(g)$? 1+2=3

   (b) Describe Carnot heat engine with P-V diagram. 3

   (c) Derive the 1st law of thermodynamics. 3

5. (a) What is Gibb's potential ? Discuss the significance of Gibbs potential. 2+3=5

   (b) Explain the terms – State function, Reversible reaction. 2+2=4

6. (a) Differentiate between Order and Molecularity. 3

   (b) Show that the half-life of a 1st order reaction is a constant. 3

   (c) What is Activation Energy ? 3

7. (a) What is Equivalent Conductance ? How it changes with dilution ? 2+2=4

(b) Give one example of each of Acidic and Basic buffer. 2

(c) Calculate the pH of 0.0005 M solution of H_2SO_4. 3

8. (a) What is Tyndal Effect ? 2

(b) Give the differences of physical and chemical adsorption. 3

(c) What are Emulsions ? Discuss the industrial importance of emulsions. 4

9. (a) Give one example of each of :
Addition reaction, Elimination reaction, Rearrangement reaction. 3

(b) Discuss the manufacturing of ethanol from Molasses. 6

10. (a) How can you convert methanol to ethanol ? 3

(b) Give one method of preparation of aldehyde from primary alcohol. 3

(c) How will you identify aldehyde and ketones ? 3

11. Write short notes on any *three* of the following : 3×3=9

(a) Grignard reagent

(b) Aromatic hydrocarbon

(c) Mesomeric effect

(d) Electrophile.

(c) How will you identify aldehyde and ketones ? 3

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