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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 path 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 $\text{SO}_2(\text{g})$ is -296.9 KJ . What is the enthalpy of dissociation of $\text{SO}_2(\text{g})$?
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

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2

solution of

3

2

d chemical

3

industrial

4

reaction,

3

al from

6

thanol ?

3

dehyde

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.