FYB.Sc (BT) - 10/10/18

Paper / Subject Code: 77405 / Chemistry II : Physical Chemistry.

Sem - II ATKT

Q. P. Code: 31307

2 ½ Hours

Total Marks: 75

1. Attempt **all** questions.
2. **All questions** carry **equal** marks.
3. Draw **neat labeled diagrams** wherever necessary.
4. Use of **log tables** and **non-programmable calculator** is **allowed**.
5. For **Q.2, Q.3 and Q.4** attempt A and B **OR** C and D.

Q.1 **Do as directed (Any fifteen)** **15**

Define the following terms

Reversible process.

Isobaric process.

Chemical kinetics.

Pseudo order reaction.

Oxidising agent.

Fill in the blanks

An _____process is a change of a system, in which the temperature remains constant.

Unit of rate of the reaction is _____.

For a first order reaction, if $t_{1/2}$ is 10min then K will be _____ min^{-1}.

Balance the equation

$Mn^{2+} + ClO_3^- \rightarrow MnO_2 + ClO_2$

$H_2SO_4 + C \rightarrow CO_2 + SO_2 + H_2O$

State True or False

In a spontaneous reaction, free energy change is positive.

In thermodynamics, 'Q' represents the internal energy of the system.

Order of a chemical reaction can be zero.

Reduction is a gain of electrons.

An oxidant undergoes oxidation.

Give one word for the following

A system that does not exchange matter or energy with the surrounding.

Reactions in which all the reactants are in the same phase.

A constant which is equal to the rate of the reaction when concentration of reactant is unity.

A molecule that donates electrons.

A charged molecule due to presence of extra electron.

Q. 2 A Explain the first law of thermodynamics and state its limitations.

Q. 2 B What are the different types of systems? Give one example of each.

OR

Q. 2 C What is entropy? List its characteristics and give its sign convention.

Q. 2 D Explain the mechanical efficiency of the Carnot's cycle.

Q. 3 A Derive the integrated rate equation for a second order reaction with equal concen... of reactants.

Q. 3 B Define and explain first order reaction with the help of an example.

OR

Q. 3 C Discuss any one method for determining the rate of the reaction.

Q. 3 D Define specific reaction rate. If a first order reaction is 25% complete in 30 minu... Calculate the specific reaction rate.

Q. 4 A Differentiate between oxidizing and reducing agents giving suitable examples.

Q. 4 B What is a substitution reaction? Explain giving suitable examples.

OR

Q. 4 C What is an oxidation number? Explain the rules to assign oxidation number.

Q. 4 D Explain the steps of balancing redox reactions using ion electron method, with

Q. 5 Write Short notes on **any three** of the following

a. Types of boundaries.

b. Isochoric processes.

c. Molecularity of the reaction.

d. Factors affecting a chemical reaction.

e. Elimination reactions.

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