PRACTICE PAPER 2012-2013

CLASS : XII **SET II** MAX. MARKS : 70

SUBJECT : CHEMISTRY. TIME : 3hours

Chemical Kinetics , Surface chemistry and General Principles and Processes of Isolation of Elements

General Instructions:

1. All questions are compulsory.
2. Marks for each question are indicated against it.
3. Question numbers 1 to 8 are very short answer questions and carry 1 mark each.
4. Question numbers 9 to 18 are short answer type and carry 2 marks each.
5. Question number 19-27 are also short answer questions and carry 3 marks each.
6. Question number 28-30 are long answer questions and carry 5 marks each.
7. Use log tables if necessary, use of calculator is not allowed.
8. There will be no overall options.
9. Internal choice is given in all three 5 marks questions.

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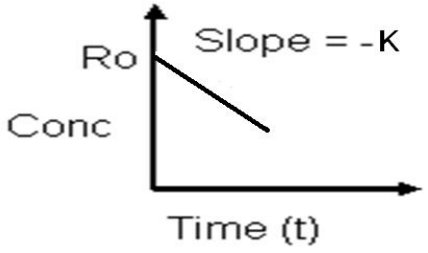
1. What is role of cryollite in the metallurgy of aluminium ?
2. Why is ferric chloride preferred over potassium chloride in case of a cut leading to blood ?
3. What is Delta ?
4. Which will be adsorbed more readily on the surface of charcoal NH_3 or CO_2 ? Why ?
5. Write expression for rate of reaction in terms of each reactant and products for the reaction $N_2 + 3H_2 \rightarrow 2NH_3$
6. For the reaction A→B, the rate of reaction becomes 27 times when the concentration of A is increased three times . What is order of reaction ?
7. Can a reaction have zero activation energy ?
8. A reaction; Reactant → Product is represented by



What will order of the reaction?

9. Describe the role of i)NaCN in the extraction of gold .
ii)SiO_2 in the extraction of copper from copper matte.

10.i)Describe the method for refining of nickel
ii) What are the constituents of German silver?
11. Why is it advantageous to roast a sulphide ore to the oxide before reduction ?
12. Write two differences between multimolecular colloids and macro molecular .colloids.
OR
Explaini) Electrophoresis&ii) Zeta potential
13. What is meant by 'Shape selective catalyst' ?
14. Explain the following observation?
i)Sun looks red at the time of setting.
ii) Physical adsorption is multilayered while chemical adsorption is mono layered.
15. The rate constant for a reaction of zero order in A is 0.0030 mol/L/S. How long will it take for the initial concentration of A to fall from 0.10M to 0.075M ?
16.I) Write the order of reaction for which rate constant is expressed in units of mol/L/s.
ii) What do you mean by pseudo 1^{st} order reaction ?
17. Differentiate between rate of reaction and reaction rate constant.
18. Distinguish between order and molecularity of reaction.
19.i) What is the role of depressant in froth floatation process?
ii)Why is extraction of copper from pyrite more difficult than that from its oxide ore through reduction?
iii) What is significance of leaching in the extraction of aluminium ?
20. The value of $\Delta_f G_o$ for formation of Cr_2O_3 is -540kJ/mol and that of Al_2O_3 is - 827kJ/mol. Is the reduction of Cr_2O_3possible with Aluminium?
21. Outline the principles of refining of metals by the following methods;
i.Zone refining ii. Electrolytic refining iii.Vapour phase refining.
22.a) Write down the reactions taking place in different zones in the blast furnace during the extraction of iron
b)Write chemical reactions taking place in the extraction of zinc from zinc blende.

23. Explaini.Ferric hydroxide sol gets coagulation on addition of sodium chloride solution
ii.Cottrell's smoke precipitator is fitted at the mouth of the chimney used in factories.
iii.Lyophyliccolloid is more stable than Lyophobic colloid.
24. Explaini. Emulsion ii. Homogeneous catalysis iii.Hardy-Schulze Rule
25. Write differences between physical and chemical adsorption.
26. What do you mean byi.Kraft temperature ii. CMCiii.Peptization
OR
What is an adsorption isotherm ? Describe Freundlich adsorption isotherm ?

27. The rate of a particular reaction double when temperature changes from 27^0C to 37^Oc .calculate the energy of activation for such a reaction (R= 8.314 J/K/mol)

28.a) For a certain reaction

A + 2B → 2C + D

The experimentally obtained information is tabulated below

Expt..	$[A]_o$	$[B]_o$	Initial rate of reaction
1.	0.30	0.30	0.096
2.	0.60	0.30	0.384
3.	0.30	0.60	0.192
4.	0.60	0.60	0.768

For this reaction

i.Derive the order of reaction with respect to both the reactants A&B

ii.Write the rate law

iii. Calculate the value of rate constant k

iv. Write the expression for the rate of the reaction in terms of A &C.

b)For a reaction

$2O_3 \rightarrow 3O_2$

Mechanism is as given below

$O_3 \rightarrow O_2 + O$ (fast)

$O_3 + O \rightarrow 2O_2$ (slow)

What will order of this reaction?

OR

a) Derive the equation for 1^{st} order rate constant.

b)Prove that for a 1^{st} order reaction time required for 99.9% completion is thrice the completion of 90% of the reaction.

29. a) The rate of reaction,

$2NO + Cl_2 \rightarrow 2NOCl$

is doubled when concentration of Cl_2 is doubled and it becomes eight times, when concentration of both NO and Cl_2 are doubled. Deduce the order ofthe reaction.

b) Nitric oxide, NO, reacts with oxygen to produce nitrogen dioxide.

$2NO + O_2 \rightarrow 2NO_2$

The rate law of for this reaction is

Rate = $k[NO]^2 [O_2]$

Propose a mechanism for the reaction

OR

a) The reaction $2NO + Br_2 \rightarrow 2NOBr$ has the mechanism

$NO + Br_2 \rightarrow NOBr_2$ (fast)

$NOBr_2 + NO \rightarrow 2NOBr$ (slow)

What will be the rate law ?

b) During anuclear explosion one of the products is ^{90}Sr with half life of 28.1years .If 1μ g of is ^{90}Sr was absorbed in the bones of a newly born baby instead of calcium , how much of it will remain after 10 years and 60 years if it is not lost metabolically .

30. a) Rate constant k of a reaction varies with temperature, according to th equation $\log k = \text{constant} - Ea/2.303RT$

Where Ea is the activation energy.

When a graph is plotted for logk verses 1/T a straight line with slope -6670k is obtained. Calculate the activation energy for the reaction in proper unit . (R=8.314J/K/mol).

b)What do you mean byi) Threshold energy ii)Collision frequency ?

OR

a)What do you mean by half life of 1st order reaction? Explain it graphically .

b)The following data were obtained during the1st order thermal decomposition of N_2O_5 (g) at a constant volume.

$2N_2O_5 (g) \rightarrow 2 N_2O_4 (g) + O_2 (g)$

Serial NO.	Time (s)	Total pressure (Atms)
1	O	0.5
2	100	0.512

Calculate the rate constant .