

## Home Assignment -

T. D. C 2nd Sem (General)

(Regular) Total Marks - 30

Group A → Answer any ~~two~~<sup>three</sup> Questions from Grp A.

① (a) Define order and molecularity of a reaction. What is pseudo first order reaction. Give one example  $1+1+\frac{1}{2}=2\frac{1}{2}$

(b) Derive an expression for the rate constant of first order reaction. What is its unit.  $\frac{2}{2}$

② Write the stoichiometric equation for which the differential rate expression is

$$\text{rate} = -\frac{d[A]}{dt} = -\frac{1}{3}\frac{d[B]}{dt} = \frac{1}{2}\frac{d[C]}{dt} \quad \frac{1}{2}$$

③ (a) What is the half life period of a reaction? Show that for a ~~1st~~<sup>2nd</sup> order reaction, half life period is inversely proportional to initial concentration.  $1+1=2$

(b) ~~Write~~ What is a zero order reaction. Derive an expression for ~~half life~~ the rate constant of a zero order reaction.  $1+1=2$

(c) Distinguish between elementary and complex reaction  $\perp$

④ (a) Derive the expression for the rate constant of a 2nd order reaction of the type  $2A \rightarrow \text{Product}$ .  $\frac{2}{2}$

(b) On the basis of Arrhenius equation, explain the effect of temperature on the reaction rate.  $\frac{2}{2}$

(c) What is temp<sup>n</sup> co-efficient  $\perp$

⑤ (a) The half life period of a first order reaction is 6.93 s. If the initial concentration of the reactant is  $0.5 \text{ mol L}^{-1}$ , at what time, the concentration of the reactant will be  $0.05 \text{ mol L}^{-1}$ .  $\frac{2}{2}$

(b) What is a photochemical reaction. Write two points of difference between photochemical and thermal reactions.  $1+2=3$

⑥ (a) Discuss the collision theory of reaction rate.  $\frac{2}{2}$

(b) The time required for 10% completion of a first order reaction at 298 K is equal to that required for 25% completion at 308 K. If the pre-exponential factor for the reaction is  $3.56 \times 10^9 \text{ sec}^{-1}$ . Calculate rate constant at 318 K and also the activation energy.  $\frac{3}{3}$

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T. D. C. 2nd Sem (Regular).

Group B, (Answer any three questions) from this group.

① (a) Name three factors which influence the size of an atom or ion. How does atomic radii vary in a period and in a group 1+1=2

(b) What is inert pair effect? Explain inert pair effect by taking the example of group 13 elements 1+1=2

(c) Explain why :-

(i) Be has higher ionization enthalpy than B in 2nd period.

(ii)  $PbO_2$  is a strong oxidizing agent 1.

② (a) What is a ligand? What are unidentate and bidentate ligand? Give example 1+1+1=3.

(b) What are hydrate isomerism and co-ordination isomerism? Give one example of each. 1+1=2.

③ (a) Show the structures of geometrical isomers of the octahedral entity  $[Co(NH_3)_4Cl_2]^+$  2.

(b) How can you explain  $[Ni(CN)_4]^{2-}$  is diamagnetic whereas  $[NiCl_4]^{2-}$  is paramagnetic? 2

(c) Explain why

~~Cr~~  $Cr^{3+}$  does not change its magnetic behaviour in  $[CrCl_6]^{3-}$  1.

④ (a) Give reasons why 2

(i) Manganese can show the highest oxidation state of +7.

(ii)  $Fe^{3+}$  is more stable than  $Fe^{2+}$

(b) Mention two important properties of d block element 2

(c) Find out the number of 3d electrons in the following ions.

(i)  $Ti^{2+}$  (ii)  $Cr^{3+}$  (iii)  $Fe^{3+}$  (iv)  $Co^{3+}$  (v)  $Cu^{2+}$