Exam Paper

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Test / Exam Name: PYQ
Student Name: ----------
Standard: 12TH SCIENCE
Section: ----------
Subject: CHEMISTRY
Roll No.: ----------

Questions: 20	Time: 60 Mins	Marks: 40

Q1. Define the following terms: **2 Marks**

i. Molar conductivity (Λ_m)

ii. Secondary batteries

Q2. Write the products of the following reaction: **2 Marks**

$6XeF_4 + 12H_2O \rightarrow$

Is this reaction a disproportionation reaction? Give reasons in support of your answer.

Q3. Name the two groups into which phenomenon of catalysis can be divided. Give an example of each group with the chemical equation involved. **2 Marks**

Q4. For a reaction **2 Marks**

$$2H_2O_2 \xrightarrow[\text{alkaline medium}]{I^-} 2H_2O + O_2$$

the proposed mechanism is as given below:

1. $H_2O_2 + I^- \longrightarrow H_2O + IO^-$ (slow)
2. $H_2O_2 + IO^- \longrightarrow H_2O + I^- + O_2$ (fast)
   i. Write rate law for the reaction.
   ii. Write the overall order of reaction.
   iii. Out of steps (1) and (2), which one is rate determining step?

Q5. Explain the following giving an appropriate reason in each case. **2 Marks**

i. O_2 and F_2 both stabilise higher oxidation states of metals but O_2 exceeds F_2 in doing so.

ii. Structures of Xenon fluorides cannot be explained by Valence Bond approach.

Q6. a. A reaction is second order in X and first order in Y. How is the rate affected when the concentrations of both X and Y are doubled? **2 Marks**

b. Write the units of 'k' for
   i. Zero order reaction.
   ii. First order reaction.

Q7. a. Although both $[NiCl_4]^{2-}$ and $[Ni(CO)_4]$ have sp^3 hybridisation yet $[NiCl_4]^{2-}$ is paramagnetic and $[Ni(CO)_4]$ is diamagnetic. Give reason. (Atomic no. of Ni = 28) **2 Marks**

b. Write the electronic configuration of d^5 on the basis of crystal field theory when:
   i. $\Delta_o < P$
   ii. $\Delta_o > P$

Q8. For an electrochemical cell $F_2(g) + 2I^-(aq) \rightarrow 2F^-(aq) + I2(s)$, give the cell representation. Also write the Nernst equation for the above cell at 25ºC. **2 Marks**

Q9. Draw the structures of the following: **2 Marks**

i. H_2S2O_8

ii. XeF_6

Q10. Write the name of the cell which is generally used in inverters. Write the reactions taking place at the anode and the cathode of this cell. **2 Marks**

Q11. Out of the following pairs, predict with reason which will allow greater conduction of electricity: **2 Marks**

i. 1M CH_3COOH solution or 0.1M CH_3COOH solution on dilution.

ii. Copper wire at 27°C or Copper wire at 50°C.

Q12. Define molar conductivity for the solution of an electrolyte. How does it vary with concentration? **2 Marks**

Q13. **2 Marks**

a. Out of 0.1 molal aqueous solution of glucose and 0.1 molal aqueous solution of KCl, which one will have higher boiling point and why?

b. Predict whether van't Hoff factor, (i) is less than one or greater than one in the following:

i. CH_3COOH dissolved in water.

ii. CH_3COOH dissolved in benzene.

Q14. Complete the following chemical equations: **2 Marks**

$Cr_2O_7^{2-} + H^+ + I^- \rightarrow$

$MnO_4^- + NO_2^- + H^+ \rightarrow$

Q15. Write two differences between 'order of reaction' and 'molecularity of reaction'. **2 Marks**

Q16. **2 Marks**

i. Why are aquatic species more comfortable in cold water than in warm water?

ii. What happens when we place the blood cell in saline water solution (hypertonic solution)? Give reason.

Q17. **2 Marks**

i. Write the type of magnetism observed when the magnetic moments are aligned in parallel and anti-parallel directions in unequal numbers.

ii. Which stoichiometric defect decreases the density of the crystal?

Q18. Calculate the degree of dissociation (α) of acetic acid if its molar conductivity (Λ_m) is 39.05 S $cm^2 mol^{-1}$. **2 Marks**

Given $\lambda^0(H^+)$ = 349.6 S cm^2 mol^{-1} and $\lambda^0(CH_3COO^-)$ = 40.9 S cm^2 mol^{-1}

Q19. Name the following coordination compounds according to IUPAC system of nomenclature: **2 Marks**

i. $[Co(NH_3)_4 (H_2O)Cl]Cl_2$.

ii. $[CrCl_2(en)_2]Cl$, (en = ethane–1, 2–diamine).

Q20. Write the name of the cell which is generally used in transistors. Write the reactions taking place at the anode and the cathode of this cell. **2 Marks**