

Equilibrium Classes

SUB: CHEMISTRY

CLASS- XII

TIME :3 Hr

M.M 70

General Instructions

(a) All questions are compulsory.

(b) Section A: Q. no. 1 to 20 are very short answer questions and carry 1 mark each.

(c) Section B: Q. no. 21 to 27 are short answer questions and carry 2 marks each.

(d) Section C: Q. no. 28 to 34 are long answer questions and carry 3 marks each.

(e) Section D: Q. no. 35 to 37 are also long answer questions and carry 5 marks each.

Section -A

Multiple choice questions

- Q1. What will be the van't Hoff factor of $K_4[Fe(CN)_6]$ if its dissociation is 50% .
(a) 5 (b) 3 (c) 4 (d) none of the above
- Q2. Sea water can be converted into fresh water by
(a) Osmosis (b) Sedimentation (c) Diffusion (d) Reverse Osmosis
- Q3. Which of the following catalyst is used in Haber's process –:
(a) Fe (b) Na (c) Mo (d) K_2SO_4
- Q4. Graph of $[R]$ vs time is a straight line . The order of the reaction is :-
(a) 3 (b) 2 (c) 0 (d) 1
- Q5. The quantity of charge required to obtain one mole of aluminium from Al_2O_3 is.
(a) 1F (b) 3F (c) 6 F (d) 2 F

Answer the following :-

- Q6 Name two compounds used as adsorbent for controlling humidity.
- Q7 Mention one shape selective catalyst used to convert alcohol directly into gasoline
- Q8. Name the battery which is generally used in inverters .
- Q9 Is it safe to stir 1M $AgNO_3$ solution with a copper spoon? Given $E^0 Ag^+ /Ag=0.80V$ $E^0 Cu^{++} /Cu=0.34V$.

Give reasons :-

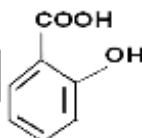
- Q 10 Generally high temperature is favourable for chemisorption.
- Q11 Physisorption decrease with increase of temperature .
- Q12 A finely divided substance is more effective as an adsorbent .
- Q 13. Identify the reaction order from each of following units of rate constants.
(i) $L mol^{-1} sec^{-1}$ (ii) $mol L^{-1} sec^{-1}$

Q14. Calculate e.m.f of the cell at 298K :- Cr /Cr³⁺ (0.1M) // Fe²⁺ (0.01M) / Fe
(Given: E⁰ Cr³⁺/Cr = -0.75V, : E⁰ Fe²⁺ / Fe = -0.45V)

Q15. A current of 0.5 ampere is flowing through a wire for 2 hours .Then how many electrons would flow through the wire .

Q 16. Define the following terms Mole fraction OR Molal depression constant (Kf)
OR

What is the IUPAC name of



Questions 6 to 10 are one word answers:

Q17 Name the substance used as depressant in the separation of two sulphide ores in Froth floatation method.

Q18. Name the linkage by which two monosaccharide units linked together to form sugar

Q19. Name the species formed when an aqueous solution of amino acid is dissolved in water?

Q20. What type of reaction occurs in the formation of Nylon 6, 6 polymer?

Section -B

Q21. 15 g of an unknown molecular material is dissolved in 450 g of water. The resulting solution freezes at -0.34°C. What is the molar mass of the material.
(Kf for water = 1.86 K kg mol⁻¹)

OR

How H₂SO₄ is manufactured by contact process. Write favorable condition with reaction

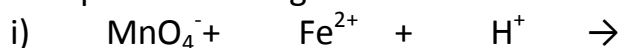
Q22. [Ti(H₂O)₆]³⁺ is violet why [Zn(OH)₄]²⁻ is colourless?

OR

Write I.U.P.A.C names: (i) K₄ [Fe (CN)₆] (ii) [Pt (NH₃)₄Cl₂]⁺

Q23. Write chemical reactions perform in blast furnace or in Bessemer converters
OR

Complete following reaction-

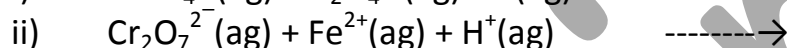
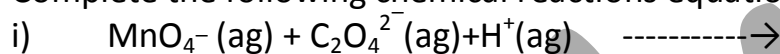


Q24. $[\text{NiCl}_4]^{2-}$ is paramagnetic while $[\text{Ni}(\text{CO})_4]$ is diamagnetic though both a tetrahedral Why?

OR

The rate of R^n quadruples when the temperature change from 293K to 313 K. Calculate the energy of activation of R^n assuming that it does not change with temperature.

Q25. (a) Complete the following chemical reactions equations:-



Q26. A voltaic cell is setup at 25°C with following half cells:-



Calculate the cell voltage [$E^\circ_{\text{Ni}^{2+}} = -0.25\text{v}$, $E^\circ_{\text{Al}^{3+}/\text{Al}} = -1.66$]

Q27. Explain the following observation about the transition/inner transition elements:

i) There is in general an increase in density of element from Ti (Z=22) to Cu (Z=29).

ii) There occurs much more frequent metal-metal bonding in compounds of heavy transition elements (3rd series).

Section -C

Q28. Two elements A and B forms compound AB_2 and AB_4 . When dissolved in 20g of Benzene (C_6H_6), 1g of AB_2 lowers the freezing point by 2.3K where as 1.0g of AB_4 lowers it by 1.3K. The molar depression constant for benzene is 5.1Kkg mol^{-1} . Calculate atomic mass of A and B.

Q29. A decimolar solution of $\text{K}_4[\text{Fe}(\text{CN})_6]$ is 50% dissociated at 300K. Calculate osmotic pressure of solution. ($R=8.314\text{ J/K mol}$)

Q30. The resistance of a conductivity cell containing 0.001M KCl solution at 298K is 1500Ω . What is the cell constant if conductivity of 0.001M KCl solution at 298K is $0.146 \times 10^{-3}\text{ S cm}^{-1}$.

OR

Show that in a first order reaction time required for completion of 99.9% is 10 times of half life of the reaction.

Q31. (A) Distinguish b/w following pairs

(a). Phenol & benzoic acid (b).propan-2-ol propan -1-ol

(B) Write the mechanism of formation of ethane from ethanol.

Q32. (A) Write conditions at which Al can reduce MgO .Explain with the help of Ellingham diagram .

(B) Give Reason –

1. Acylation of aniline is necessary before nitration.
2. Why o-nitrophenol has low boiling point than p-nitrophenol?

Q-33 Draw the structure of --- 1.Sucrose 2. Maltose 3. XeO₂F₂

Q34. What is the chemical reaction of-----

(a) lead storage battery (b) Ni/Cd battery

OR

[a] C₆H₅NH₂, C₂H₅NH₂, (C₂H₅NH)₂, NH₃ (Arrange the following in increasing value of Kb)

[b] C₂H₅OH, C₂H₅NH₂, (CH₃)₂NH (Arrange the following in increasing order of B.P)

Section –D

Q35. Write only chemical reactions

- A. Rosenmund reduction B.Carbyl amine reaction
C Hoffmann's reaction D.Cannizaro's Rⁿ E. Wolff Kishner reduction

OR

In a pseudo first order hydrolysis of ester in water, the following results were obtained.

t/s	0	30	60	90
[Ester]/mol L ⁻¹	0.55	0.31	0.71	0.085

- (i) Calculate the average rate of Rⁿ b/w the time interval 30 to 60 second.
- (ii) Calculate the pseudo first order rate constant for hydrolysis of ester.

Q36. An organic compound 'A' on treatment with aqueous solution of ammonia and heating forms compound 'B' which on heating with Br₂ and KOH forms a

compound 'C' of molecular formula C_6H_7N . Write structure of & I.U.P.A.C names of A, B, & C. Write chemical reactions involved.

OR

Arrange the following according to given instructions

- [A] $HClO_4, HClO_3, HClO_2, HClO$ (INCREASING ACIDIC STRENGTH)
[B] F_2, Cl_2, Br_2, I_2 (INCREASING BOND DISSOCIATION ENERGY)
[d] HF, HCl, HBr, HI (INCREASING ACIDIC CHARACTER)
[E] H_2O, H_2S, H_2Se, H_2Te (THERMAL STABILITY)

Q37. [A] Determine the amount of $CaCl_2$ ($i=2.47$) dissolved in 2.5 litre of water such that its osmotic pressure is 0.75atm at $27^\circ C$

[B] What are main constituents of dettol ?

(OR)

- (A) Carry out following conversions
1. Prop-1-ene to propan-2-ol
 2. Methanamine to ethanamine
 3. Chlorobenzene to Diphenyl
- (B) What happens when , Write chemical reactions
- (a) Toluene is treated with $KOH/KMnO_4$
 - (b) Benzene diazonium chloride is treated with H_3PO_2

Best Of Luck My dear Students for Exam-2020

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