विद्या सर्वार्थ साधिका

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MID TERM EXAMINATION

Class : XII

Subject: Chemistry M.M : 70

Date: 24/9/2019 Time : 3 Hours

General Instructions:

1. All questions are compulsory. There are 37 questions in all.
2. Question numbers 1 to 20 are objective type questions and carry 1 mark each.
3. Question number 21 to 27 are short answer questions and carry 2 marks each.
4. Question number 28 to 34 are short answer questions and carry 2 marks each.
5. Question number 35 to 37 are long answer questions and carry 5 marks each.

1. Which of the following is not a favourable condition of physical adsorption. (1)
   (a) High pressure (b) Negative ΔH
   (c) High critical temperature of adsorption (d) High temperature

2. Match the expression with Laws. (1)

(i) Expression of Henry's Law	(a) $\pi = nRT$
(ii) Expression of Osmotic pressure	(b) $P = K_H X$
	(c) $\pi = CRT$
	(d) $P = K_b X$

3. Aquatic species are more comfortable in cold water due to _____ solubility of oxygen. (1)

   OR

   The solution of ethanol in acetone will show _____ deviation from Raoult's law.

4. Delta is a place where river meet the sea. The formation of delta occurs as a result of: (1)
   (a) Coagulation (b) Colloidal formation
   (c) Emulsification (d) Electrophoresis

5. The vapour pressure of the solution decreases when a _____ solute is added to the solvent. (1)

   OR

   When A-B interactions are _____ than A-A and B-B interactions, then the solution will show negative deviation.

6. The IUPAC name of sec-Butyl chloride is : (1)
   (a) 2-Chlorobutane (b) 1-Chlorobutane
   (c) 2- methylchloropropane (d) 3- methylchloropropane

   OR

   Which of the following has highest boiling point.
   (a) 1-Bromopropane (b) 2-Bromobutane
   (c) 2- methylchloropropane (d)1-Bromobutane

7. The reaction of Lucas reagent is fastest with: (1)
   (a) $(CH_3)_3COH$ (b) $(CH_3)_2CHOH$
   (c) $CH_3(CH_2)_2OH$ (d) CH_3CH_2OH

8. The method generally employed for the coagulation of a colloidal sol is: (1)
(a) Addition of electrolyte. (b) Condensation
(c) Dialysis (d) Diffusion through animal membrane.

9. In the following questions a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct option out of the choices given below each question. (1)
Assertion (A): The boiling point of alkyl halide decreases in the order:RI >RBr >RCl >RF
Reason (R): The boiling point of alkyl halides are considerably higher than that of the hydrocarbon of comparable molecular mass.
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

10. The reaction responsible for formation of blister copper is - (1)
(a) $2Cu_2O+Cu_2S \rightarrow 6Cu+SO_2$
(b) $Cu_2O+C \rightarrow 2Cu+CO$
(c) $2Cu_2S+3O_2 \rightarrow 2Cu_2O+2SO_2$
(d) $2Cu^{2+}(aq)+Fe(s) \rightarrow Cu(s)+Fe^{2+}(aq)$

11. The rate constant has the same unit as rate of reaction for a _____ order reaction. (1)

12. The increasing order of the rate of HCN addition to compounds is (1)
A. HCHO B. CH_3COCH_3 C. $PhCOCH_3$ D. PhCOPh
(a) A < B < C < D (b) D < B < C < A
(c) D < C < B < A (d) C < D < B < A

13. A first order reaction has a half life period of 34.65 second. Its rate constant is: (1)
(a) 0.2×10^{-2} sec^{-1} (b) 4×10^{-2} sec^{-1}
(c) $20sec^{-1}$ (d) 2×10^{-2} sec^{-1}

OR

The first order rate constant for the decomposition of N_2O_5 is $6.2 \times 10^{-3}sec^{-1}$. The $t_{1/2}$ of the decomposition
(a) 117.7 sec (b) 111.7 sec
(c) 228.4 sec (d) 168.9 sec

14. If ore and gangue differ in their gravities, the suitable method for concentration of ore is (1)
(a) Magnetic Separation (b) Froth floatation method
(c) Hydraulic washing (d) Leaching

15. When temperature for a reaction increases from 30ºC to 60ºC, the rate of reaction increases _____ times. (1)

16. Two common by-products of fermentation of Cane Sugar are Ethanol and_____. (1)

OR

On prolonged exposure of Ethanol to atmosphere, it gives vinegar like smell due to _____ process.

17. Formaldehyde reacts with Methylmagnesium bromide followed by acid hydrolysis to yield 1^o alcohol.(True or False) (1)

18. In Van-Arkel method volatile metal zirconium (Zr) is converted into non-volatile ZrI_4.(True or False) (1)

19. In allylic alcohol the -OH group is bonded to a _____ hybrid carbon atom. (1)

20. Aspirin is an acetylation product of: (1)

(a) p-dihydroxybezene (b) o-hydroxybenzoic acid

(c) o-dihydroxybenzene (d) m-hydroxybenzoic acid

OR

Carbolic acid is...

(a) Phenol (b) Benzene

(c) Phenyl Acetate (d) Salicylic acid

21. A solution containing 13.5 g urea per 500 mL of solution in water has same osmotic pressure as a solution of sucrose ($C_{12}H_{22}O_{11}$) in water. Calculate the mass of sucrose present in 500 mL of its solution. (2)

22. How will you bring about the following conversions? (2)

(i) Toluene to benzyl alcohol (ii) But-1-ene to but-2-ene

OR

How can you bring about following conversions?

(i) Ethanol to but-1-yne (ii) Propene to propyne

23. Write a short note on each of the following: (2)

(i) Kolbe's reaction. (ii) Reimer – Tiemann reaction.

24. A reaction is second order with respect to a reactant. How is the rate of reaction affected if the concentration of the reactant is (i) doubled (ii) reduced to half? (2)

OR

For the first order reaction, show that time required for completion of 99.9% of reaction is 3 times the time required for completion of 90% of reaction.

25. Account for the following: (2)

(a) Ortho-nitrophenol is more acidic than ortho- methoxy phenol.

(b) Unlike phenols, alcohols are easily protonated.

OR

Write the mechanism of hydration of ethene to yield ethanol.

26. (a) Give reason why a finely divided substance is more effective as an adsorbent. (2)

(b) Why is adsorption always exothermic?

27. What are ambident nucleophiles? Explain with an example. (2)

28. Which of the following pair will have higher conductance and why? (3)

(a) Copper wire and acetic acid solution

(b) Copper wire at 25^0C and Copper wire at 50^0C

(c) 0.1 M acetic acid and 1 M acetic acid.

29. How is elevation in boiling point related to lowering of vapour pressure? Use this relation to derive the relationship between ΔTb and molality. (3)

30. (a) Why is the reduction of a metal oxide easier if the metal formed is in liquid state at the temperature of reduction?

(b) The reaction, $Cr_2O_3 + 2\ Al \rightarrow Al_2O_3 + 2\ Cr$ ($\Delta G^0 = -421$ kJ) is thermodynamically feasible as is apparent from the Gibbs energy value. Why does it not take place at room temperature?

(c) What is the role of depressant in froth floatation process?

31. The reaction between A and B is first order with respect to A and zero order with respectto B. Fill in the blanks in the following table: (3)

Experiment	[A] / M	[B] / M	Initial rate /M min^{-1}
I	0.1	0.1	2.0 X 10^{--2}
II	--	0.2	4.0 X 10^{-2}
III	0.4	0.4	--
IV	--	0.2	2.0 X 10^{-2}

32. Explain the following terms: (3)
(i) Electrophoresis (ii) Dialysis (iii) Tyndall effect

OR

How are the following colloids different from each other with respect to dispersion medium and dispersed phase? Give one example of each type.
(i) An aerosol (ii) A hydrosol (iii) An emulsion

33. Write the names of reagents & equations for the preparation of the following ethers by Williamson's synthesis : (3)
(a) 1 – Propoxypropane
(b) Ethoxybenzene
(c) 2 – Methoxy – 2 – methylpropane

OR

Predict the product of following
(a) $CH_3CH_2CH_2$-O-CH_3 +HBr→
(b) C_6H_5-O-C_2H_5 + HBr →
(c) $(CH_3)_3$C-O-C_2H_5 + HI→

34. An organic compound (A) which has characteristic odour, on treatment with NaOH forms compounds (B) and (C). Compound (B) has molecular formula C_7H_8O which on oxidation gives back (A). Compound (C) is the sodium salt of an acid. When (C) is heated with soda-lime, it yields an aromatic compound (D). Deduce the structures of (A), (B), (C) and (D). Write the sequence of reactions involved (3)

OR

Account for the following:
(a) Chloroacetic acid is stronger acid than acetic acid.
(b) Aldehyde are more reactive than ketones towards nucleophiles.
(c) Aldehydes are more volatile than the corresponding alcohols.

35. (a) Find the molar conductivity of acetic acid if its conductivity is given to be 0.00241 M. Also, calculate its dissociation constant, if the value of $\Lambda^0_m$is given to be390.5 S cm^2 mol^{-1}. (5)
(b) Write the Nernst equation and emf of the following cell at 298 K:

$Mg(s) \mid Mg^{2+}(0.001M) \parallel Cu^{2+}(0.0001\ M) \mid Cu(s)$
[$E^0_{Mg/Mg2+}$= -2.36V and $E^0_{Cu/Cu2+}$ = 0.34V]

OR

(a) What type of a battery is lead storage battery? Write the anode and cathode reactions and the overall cell reaction occurring in the operation of a lead storage battery.
(b) Calculate the cell voltage of a voltaic cell, set up at 25°C with the following half - cells:
Al | Al^{3+} (0.001 M) and Ni | Ni^{2+} (0.50 M)
[$E^0_{Ni \mid Ni2+}$= - 0.25V and $E^0_{Al \mid Al3+}$ = -1.66V]

36. (a) What happens when: (5)

(i) n-butyl chloride is treated with alcoholic KOH.

(ii) ethyl chloride is treated with aqueous KOH.

(iii) methylchloride is treated with KCN.

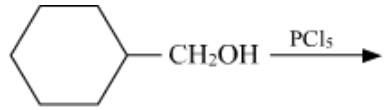
(b) Arrange the compounds of each set in order of reactivity towards S_N2 displacement:
2-Bromo-2-methylbutane, 1-Bromopentane, 2-Bromopentane

(c) Identify the compound in the following pair that reacts at the faster rate through S_N1 mechanism
$(CH_3)_2CHI$ and $(CH_3)_2CHCH_2I$

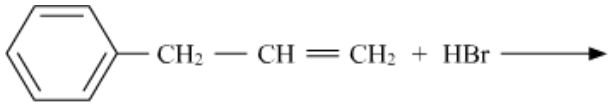
OR

(a) Draw the structures of major monohalo products in each of the following reactions :

(i)



(ii)



(b) Which halogen compound in each of the following pairs will react faster in S_N2 reaction:

(i) CH_3Br or CH_3I

(ii) $(CH_3)_3C-Cl$ or CH_3-Cl

37. (a) Give a chemical tests to distinguish the following compounds: (5)

(i) Benzoic acid and Phenol

(ii) Propanal and Propanone :

(b) Arrange the following compounds in an increasing order of their property as indicated:

(i) Acetaldeyde, Acetone, Methyl tert-butyl ketone (reactivity towards HCN)

(ii) Benzoic acid, 3,4-Dinitrobenzoic acid, 4-Methoxybenzoic acid (acid strength).

(iii) $CH_3CH_2CH(Br)\ COOH$, $CH_3CH\ (Br)\ CH_2COOH$, $(CH_3)_2CHCOOH$ (acid strength)

OR

(a) Account for the following:

(i) CH_3CHFCH_2COOH is a stronger acid than $CH_2FCH_2CH_2COOH$.

(ii) Carboxylic acids do not give characteristic reactions of carbonyl group.

(b) Write the chemical equations to illustrate the following name reactions:

(i) Rosenmund reduction

(ii) Cannizzaro's reaction

(c) Out of $CH_3CH_2-CO-CH_2-CH_3$ and $CH_3CH_2-CH_2-CO-CH_3$, which gives iodoform test?