First Terminal Examination 2016 - 2017

Class – XII
Subject – Chemistry

Time : 3 Hours

Max. Marks : 70

General Instructions :

(a) All questions are compulsory.

(b) Q. 1 - 5 are very short answer questions each of 1 mark.

(c) Q. 6 - 10 are short answer questions of 2 marks each.

(d) Q. 11 - 22 are also short answer questions of 3 marks each.

(e) Q. 23 is a value based question carrying 4 marks.

(f) Q. 24 - 26 are long answer questions of 5 marks each.

(g) Use log tables wherever necessary.

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1. Why does the electrical conductivity of semiconductor increases and of metallic conductors decreases with the rise in temperature ?

2. Two liquids A and B boil at $145°C$ and $190°C$ respectively. Which of them has higher vapour pressure at $80°C$ and why ?

3. How many grams of conc. HNO_3 solution should be used to prepare 250 ml of 2.0 M HNO_3 ? The conc. acid is 70 % HNO_3 by mass.

4. Define Ferromagnetism with an example.

5. Write the IUPAC name of the following :

CH = CHCH$_3$
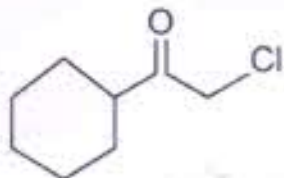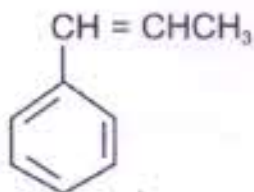
6. Write the reactions involved when D-glucose is treated with the following reagents :

(a) hydroxylamine

(b) conc. HNO_3

7. The chemistry of the corrosion of iron is essentially an electrochemical phenomena. Explain the reactions occurring during the corrosion of iron in the atmosphere.

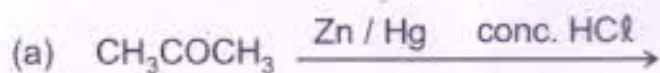8. Write the mechanism for Friedel Craft alkylation for the following reaction :

   Identify the product obtained for the same reaction :

   $$C_6H_6 + CH_3CH_2CH_2C\ell \longrightarrow \text{.................................}$$

9. Give reasons for the following :

   (a) Benzophenone does not react with $NaHSO_3$

   (b) CH_3CHO does not undergo Cannizaro reaction

10. Write the structures of the products of the following reactions :

    (a) $CH_3COCH_3 \xrightarrow{\text{Zn / Hg} \quad \text{conc. HC}\ell}$

    (b) $C_2H_5COC_2H_5 + NH_2CONHNH_2 \longrightarrow \text{.................................}$

11. Roasting of Zn sulphide ore gives a gas X as a by product. This is a colourless gas with chocking smell of burnt sulphur and causes great damage to respiratory organs as well as causes acid rain. Its aqueous solution is acidic, acts as a reducing agent and its acid has never been isolated. Identify the gas and write the reactions involved. Name the process of concentration of this ore.

12. Distinguish between the following :

    (a) Cyclohaxanone and Cyclohexanal

    (b) Aniline and N,N Diethyl propanamine

    (c) Propan-1-ol and propan-2-ol

13. Convert the following :

    (a) Tertiary butyl bromide to isobutyl bromide

    (b) Aniline to phenylisocyanide

    (c) Ethanamine to N-Ethylethanamide

14. Write structures and IUPAC names of :

(a) The amide which gives propanamine by Hoffmann bromamide reaction.

(b) Alcohol formed by reacting methanal with methylmagnesium chloride.

(c) Alcohol formed on oxidation of cumene.

15. Why are Vitamin A and Vitamin C essential to us. Give their important sources. Giving an example, define Zwitter ion and explain its effect on solubility ?

16. (a) Name the actions of the following on the human body :

   (i) Aspirin   (ii) Penicillin

(b) Why is the use of aspartame limited to cold foods and drinks ?

(c) What are the main constituents of dettol ?

17. (a) How is Dacron obtained from ethylene glycol and pterephthalic acid ? (Give reactions)

(b) Write the names and structures of monomers used for getting the following polymers and give one use of each :

   (i) PVC

   (ii) Bakelite

18. Write the structures of major products expected from the following reactions :

(a) Mononitration of 3-methylphenol

(b) Mononitration of phenylmethanoate

(c) Ethoxy-2-methyl butane with HI

19. A copper silver cell is set up. The copper ion concentration in it is 0.10 M. The concentration of silver ion is not known. The cell potential measured is 0.422 V Determine the concentration of silver ion in the cell.

   (Given : $E^{o}_{Ag^{+}/Ag}$ = 0.80 V, $E^{o}_{Cu^{2+}/Cu}$ = +0.34 V)

20. $t_{1/2}$ of a reaction is halved as the conc. of reactant is doubled. Calculate order.

21. Aluminium crystallizes in a cubical closed pack structure. Its metallic radius is 125 pm.

(a) What is the length of the side of unit cell ?

(b) How many unit cells are there in $1.00 cm^3$ of Aℓ.

22. Two electrolytic cells containing $AgNO_3$ solution and dilute H_2SO_4 solution were connected in series. A steady current of 2.5 Amp was passed through them till 1.078 g of silver was deposited. (Given : Ag = 107.8 g mol^{-1},1 F = 96500)

(a) How much electricity was consumed ?

(b) What was the weight of oxygen gas liberated ?

(c) Give reason :

(i) Rusting of iron pipe can be prevented by joining it with a piece of magnesium.

(ii) Conductivity of an electrolyte solution decreases with the decrease in conc.

23. Identify A, B C, D, E and F in the following :
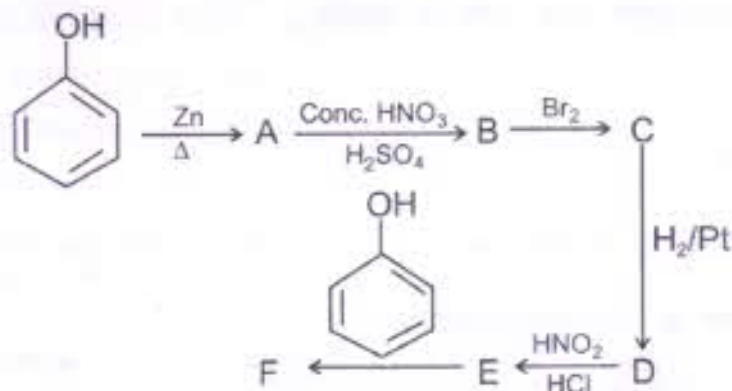
24. An alkene A (Mol formula C_5H_{10}) on ozonolysis gives a mixture of two compounds B and C. Compound B gives positive Fehling's test and also, forms iodoform on treatment with I_2 and NaOH. Compound C does not give Fehling's test but forms iodoform. Identify the compound A, B and C. Write the reaction for ozonolysis and formation of iodoform from B and C.

Convert acetophenone to m-nitrobenzoic acid.

Complete the following :

(a)

$$CH_3 — CH_2 — \overset{\overset{\displaystyle CH_3}{|}}{CH} — CH_2 — O — CH_2 — CH_3 + HI$$

(b)
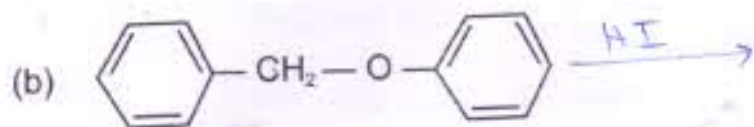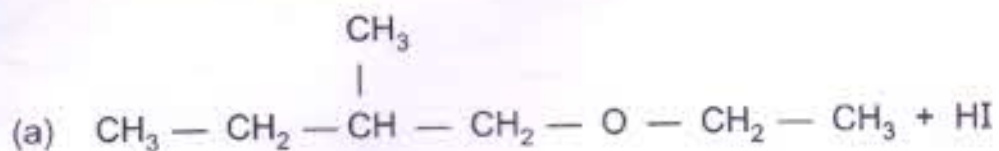
25. Derive the relationship between relative lowering of vapour pressure and mole fraction of the volatile liquid.

0.5 g KCl was dissolved In 100 g water and the solution originally at $20^\circ C$, froze at $0.24^\circ C$. Calculate the percentage ionization of salt. K_f per 1000 g of water = 1.86 K/m

Which aqueous solution has higher concentration ?

    1 molar or 1 molal solution of the same solute

26. Rate constant of decomposition of HI at $283^\circ C$ and $508^\circ C$ are 3.517×10^{-7} and 3.954×10^{-2} respectively. Calculate frequency factor and Ea :

(a) Derive an expression for first order reaction.

(b) Define average rate constant.

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