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CHENNAI REGION
CLASS XII COMMON PRE-BOARD EXAMINATION-2016-17

Subject: Chemistry

Time Allotted : 3 Hrs

Total marks : 70

Instructions:

- Answer all the questions.
- Questions 1 to 5 are very short answer type and carry one mark each. Answer them in one word or in one sentence.
- Questions 6 to 10 are short answer type and carry 2 marks each. Answer them in 20 words.
- Questions 11 to 22 are short answer type and carry 3 marks each. Answer them in 30 words.
- Question 23 is value based question and carry 4 marks.
- Questions 24 to 26 are long answer type and carry 5 marks each. Answer them in 50 to 60 words.
- All 5 mark questions, one 3 mark question and one 2 mark question have internal choice. There is no overall choice.
- Use log book wherever needed. Use of calculator or any other electronic item is strictly prohibited.

- 1 What is the formula of a compound in which the element Y at each corner X at the centre of alternate faces of the unit cell ? 1
- 2 What happens when phenol reacts with bromine water ? 1
- 3 Arrange $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$, $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$, $\text{H}_5\text{C}_2\text{-O-C}_2\text{H}_5$, $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$ in the increasing order of boiling points. 1
- 4 Arrange in decreasing order of the pK_b values:
 $\text{C}_2\text{H}_5\text{NH}_2$, $\text{C}_6\text{H}_5\text{NHCH}_3$, $(\text{C}_2\text{H}_5)_2\text{NH}$ and $\text{C}_6\text{H}_5\text{NH}_2$ 1
- 5 Name the base not present in DNA. 1
- 6 Give reasons 2
- i) aquatic species is more comfortable in cold water in comparison to warm water.
- ii) Vapour pressure of an aqueous solution of glucose lower than that of water.
- Or
- Which aqueous solution has higher concentration 1 molar or 1 molal solution of the same solute. Give reason. 2
- 7 Which cell was used in Apollo Space programme? What are its advantages over ordinary cell? 2
- 8 Give Reasons: 2
- (i) Mn^{2+} ion shows maximum paramagnetic character amongst the bivalent ions of 3d series
- (ii) Salts of Scandium are white in colour.
- 9 Explain with example 2
- i) Sandmeyer's reaction
- ii) Finkelstein reaction
- 10 Give chemical tests to distinguish between the following: 2
- i) Ethanoic acid and ethyl ethanoate
- ii) Propanal and propanone.

- 11 The boiling point of benzene is 353.23 K. When 1.80 g of a non-volatile solute was dissolved in 90 g of benzene, the boiling point is raised to 354.11 K. Calculate the molar mass of the solute. K_b for benzene is $2.53 \text{ K kg mol}^{-1}$. 3
- 12 A cell is set up at 25°C with the following half cells
Mg (0.001 M)/ Mg^{2+} and Cu^{2+} (0.0001 M)/Cu.
What would be voltage of cell ? $E^\circ_{\text{cell}} = 2.71\text{V}$ 3
- 13 Give reasons
i) deltas are formed where river and sea water meet.
ii) powdered substances are more effective adsorbents than their crystalline forms
iii) it is necessary to remove CO when NH_3 is obtained by Haber's process 3
- 14 Describe the role of
(a) Depressant in Froth floatation process. 3
(b) lime stone in the extraction of Fe from Haematite ore.
(c) Cryolite in the metallurgy of Al.
- 15 Arrange the following in the order of property indicated for each set:
(i) F_2 , Cl_2 , Br_2 , I_2 - increasing bond dissociation enthalpy. 3
(ii) HF, HCl, HBr, HI - increasing acid strength.
(iii) NH_3 , PH_3 , AsH_3 , SbH_3 , BiH_3 – increasing base strength
OR
Draw the structures of
i) H_3PO_3
ii) XeF_4
iii) BrF_3 3
- 16 Compare the chemistry of the actinoids with that of lanthanoids with reference to:
i) electronic configuration
ii) oxidation states and
iii) atomic and ionic sizes 3
- 17 Give reasons
i) Tetrahedral complexes do not show geometrical isomerism.
ii) $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ is strongly paramagnetic 3
iii) $[\text{Co}(\text{NH}_3)_6]^{3+}$ is an inner orbital complex
- 18 Bring out the following conversions:
(i) A primary alcohol to an aldehyde 1
(ii) Butan-2-one to butan-2-ol 1
(iii) Phenol to 2, 4, 6-tribromophenol 1
- 19 Give reasons:
a) $\text{p}K_b$ of aniline is more than methyl amine.
b) Aniline does not undergo Friedel Crafts alkylation. 3
c) The presence of a base is needed in the ammonolysis of alkyl halides
- 20 i) write the name of two monosaccharides obtained on hydrolysis of lactose sugar.
ii) Why Vitamin C cannot be stored in our body ?
ii) What is the difference between a nucleoside and nucleotide ? 3
- 21 Write the names of monomers of the following polymers:
i) Nylon 6,6
ii) Neoprene 3
iii) Buna-N
- 22 Mention one use of each of the following
i) Ranitidine
ii) Paracetamol
iii) Tincture of iodine 3
- 23 Tina took Sheena to her ancestral house in a village. The house is more than 100 years old. Sheena observed glass panes fixed to windows or doors are slightly thicker at the bottom than at the top. Also, she observed that some glass objects are milky in appearance.
(a) Why are glass panes fixed to windows or doors of old building slightly thicker at the bottom than at the top?
(b) Why do some glass objects appear milky in appearance? 4

(c) What values are shown by Tina and Sheena ?

- 24 i) The rate constant of a reaction is $3.5 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$. What is the order of the reaction? 1
ii) What is a pseudo unimolecular reaction? Give an example. 2
iii) For a first order reaction, show that time required for 99% completion is twice the time required for the completion of 90% of reaction. OR 2

a) Explain the following terms.

i) Order of reaction. 1

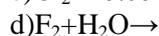
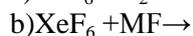
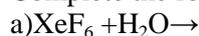
ii) Molecularity of reaction. 1

b) The rate of a reaction becomes 4 times when temperature changes from 293K to 313K. Calculate the energy of activation (E_a) of the reaction assuming that it does not change with temperature. ($R = 8.134 \text{ J/K/mol}$, $\log 4 = 0.6021$) 3

- 25 An element A, exists as a yellow solid in standard state. It forms a volatile hydride B, which is foul smelling. When treated with oxygen, B forms an oxide C, which is a colourless pungent smelling gas. This when passed through acidified KMnO_4 , decolourises it. C gets oxidized to another oxide D, with a heterogeneous catalyst. Identify A, B, C, D and give chemical equation for the reaction of C with KMnO_4 . 5

OR

Complete the following;



- 26 a) Illustrate the following name reactions by giving examples.

i) Cannizzaro's reaction

ii) Clemmensen reduction

b) An organic compound A of molecular formula $\text{C}_5\text{H}_{10}\text{O}$ does not reduce Tollen's reagent but forms an addition compound with sodium hydrogen sulphite and gives positive iodoform test. On vigorous oxidation it gives ethanoic acid. Derive the possible structure of compound A and explain all reactions

OR

How are the following obtained

a) i) Benzoic acid from Ethyl benzene

ii) Benzaldehyde from toluene.

b) Complete each synthesis by giving missing material, reagent or product

