

2017

CHEMISTRY

(Theory)

Full Marks : 70

Pass Marks : 21

Time : Three Hours and *Fifteen Minutes

(*15 minutes are given as extra time for reading questions)

All the Questions are compulsory.

The figures in the right margin indicate full marks for the questions.

(Q. Nos 1-10 are Very Short Answer (VSA) type of 1 mark each.)

1. Define Curie temperature. 1
2. Why inversion of cane sugar is called pseudo first order reaction ? 1
3. What is relationship between Gold number and Protective power ? 1
4. What is the cause of tailing of mercury in thermometer ? 1
5. Give an example of complex compound having oxidation number zero of metal-ion. 1

6. A compound "X" on treatment with excess of NH_4SCN gives red coloured precipitate and with $K_2[Fe(CN)_6]$ gives blue colouration. Write the possible chemical formula of the compound "X". 1
7. Sparingly soluble silver chloride is readily soluble in methyl amine solution. Give reason. 1
8. Why aniline can not be prepared by Gabriel Phthalimide synthesis method? 1
9. Name the Vitamin soluble in water and its deficiency causes scurvy. 1
10. Though aspirin is harmful to stomach, it is useful to prevent heart attack. Give reason. 1

Q. Nos. 11-14 are Objective type carrying 1 mark each. Choose and rewrite the best answer out of the given alternatives.

11. If the radius ratio of an ionic compound is within the range 0.414 to 0.732, the probable co-ordination number and structural arrangement will be — 1
- A. 3 and trigonal planer
- B. 4 and tetrahedral
- C. 6 and octahedral
- D. 8 and cubical

12. In the oxidation reaction of acidified $KMnO_4$ with $FeSO_4$, Mn^{+2} ion so produced act as a/an — 1

A. Promotor

B. Auto-Catalyst

C. Poisoning

D. Inhibitor

13. Boiling points of alcohols are higher than those of ethers of comparable molecular mass due to the — 1

A. association of molecules with hydrogen bonding

B. dissociation of molecules into fractions

C. formation of dimers

D. presence of hydroxyl groups in alcohol.

14. Denaturation of protein do not change the 1

A. Quaternary structure of protein

B. Tertiary structure of protein

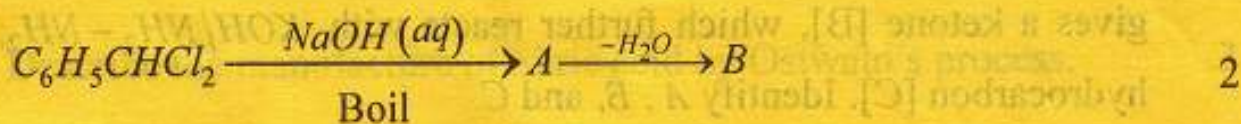
C. Secondary structure of protein

D. Primary structure of protein.

Q. Nos. 15-24 are Short Answer (SA-II) types of 2 marks each.

15. Two elements A and B formed a compound. Atoms of B form CCP and atoms of A occupy one third of the tetrahedral voids. What will be the formula of the compound? 2
16. Half life period of a radioactive element is 1.5×10^{10} yrs. Calculate the time for the activity of the element reduced to 80% of its original value.
(Given that $\log 80 = 1.9031$) 2
17. Derive a mathematical relation between temperature and the rate constant to determine the activation energy of a reaction which occur at different temperature. 2
18. Write the process of preparing an ultra filter from an ordinary filter paper. 2
19. Show how ammonia is prepared from calcium carbide and alumina separately. 2
20. Explain high and low spin complexes with reference to d^4 -complexes. 2
21. Explain the extra stability of Chlorobenzene. 2
22. What are the basic functional differences of antiseptics and disinfectants? 2

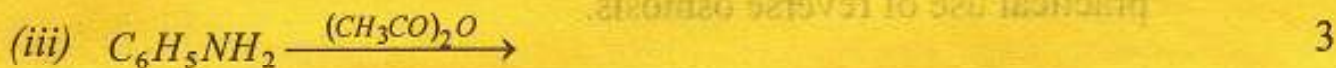
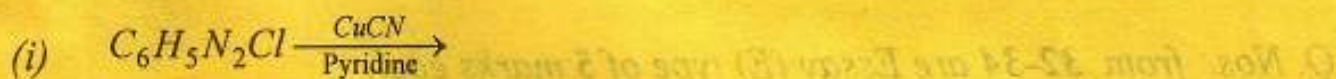
23. Predict the product *A* and *B* in the following reaction and name them. 20



24. Write a note on mutarotation. 2

Q. Nos. 25-31 are Short Answer (SA-I) types of 3 marks each.

25. Write the chemical formula and name of the products in the following reactions.



26. What are refractory materials and give one example each of the types of it. 3

27. Explain the inter conversion of chromate and dichromate ions by alteration of pH with the help of the suitable chemical equation. 3

28. How can you convert phenol to benzene, aniline and Picric acid? 3

29. Write the chemical equation for the conversion of benzaldehyde to toluene, styrenes and hydrobenzamide. 3

30. A symmetrical alkene [A] having molecular formula $C_{18}H_{20}$ on ozonolysis gives a ketone [B], which further reacts with $KOH/NH_2 - NH_2$ to give a hydrocarbon [C]. Identify A, B, and C. 3

31. (i) What is the basic structural difference of monomers of synthetic and natural rubbers ?

(ii) Explain the needs of vulcanization of natural rubber. How is natural rubber vulcanised ? 1+2=3

Q. Nos. from 32-34 are Essay (E) type of 5 marks each.

32. (i) State the condition leading to reverse osmosis. Give one important practical use of reverse osmosis.

(ii) 15g of a substance dissolved in 100g of water produced a depression of $1.2^\circ C$ at freezing point. Calculate the molecular mass of the substance if k_f of water is $18.5^\circ C$ per 100g. 2+3=5

33. (i) Justify that $CuSO_4$ solution can be kept safely in a silver vessel while $AgNO_3$ can not be kept in a copper vessel.

(ii) SHE is known as reversible one as it can act both as cathode and anode. Considering this property how can you determine the standard electrode potentials of zinc and copper ? 2+3=5

34. (i) Describe the structure of the *two* crystalline sulphur allotropes. 2
- (ii) Describe the manufacture of nitric acid by Ostwald's process. 3
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