

2016

**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 Questions are compulsory.

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

(Questions 1-10 are Very Short Answer (VSA) type carrying 1 mark each.)

1. Define liquid crystals. 1
2. State Henry's law. 1
3. What is the molecularity of a reaction. 1

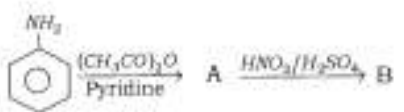
4. What is the significance of negative sign in reaction rate when expressed with respective reactants. 1
5. Give an example of pseudo-first order reaction. 1
6. How is  $Fe(OH)_3$  sol positively charged when prepared by adding  $FeCl_3$  into hot water? 1
7. Write the Principle of Froth Floatation method of concentration of metal sulphides. 1
8. Give one example each of homoleptic and heteroleptic complexes. 1
9. Write the chemical equation for the nitration of anisole. 1
10. How is Tollen's reagent prepared in the laboratory? 1

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

11. Super conductors are 1
  - (A) Diamagnetic
  - (B) Paramagnetic
  - (C) Plastics
  - (D) Amorphous.

12. Elevation in boiling point temperature,  $\Delta T_b$  is 1
- (A) Colligative Property
- (B) Intrinsic Property
- (C) Extensive Property
- (D) Non-colligative Property.
13. Gammaxane is another form of 1
- (A) PVC
- (B) BHC
- (C) PDB
- (D) DDT
14. The macromolecule which is NOT a polymer out of the following is : 1
- (A) Chlorophyll
- (B) Dacron
- (C) Novolac
- (D) Glyptal

Questions 15 - 24 are Short Answer (SA-II) type carrying 2 marks each.

15. What are paramagnetism and diamagnetism ? 2
16. Derive the expression for the Half life Period of a first order reaction. 2
17. Differentiate Roasting and Calcination in two points. 2
18. Write the cause of Lanthanoid Contraction. 2
19. Explain how ruby and emerald gemstones impart colour. 2
20. From Benzene diazonium chloride, how will you prepare 2
- (i) Phenol and
- (ii) Diphenyl
21. Complete the reaction 2
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22. What is invert sugar and how is it formed ? Give the reaction. 2
23. "Certain diseases are caused by the deficiency of enzyme". Illustrate it by considering cause and effects on two cases of diseases. 2

24. Write the reaction steps involved in the formation of polyisobutylene. 2

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

25. Give an example of excellent anti-freeze additive in car coolants and calculate the molar mass of a liquid whose molar enthalpy of formation at 273K is  $6.0246 \text{ kJmol}^{-1}$  and molal depression constant is  $1.85 \text{ K kgmol}^{-1}$ . 3

26. What is dialysis? Explain the process of electro-dialysis. 3

27. Give reasons why? 3

- (i) Water is liquid but  $\text{H}_2\text{S}$  is gas.
- (ii) White phosphorus is kept in water.
- (iii) Noble gases are chemically inert.

28. Explain with an example each for transition metals regarding. 3

- (i) Catalytic property
- (ii) Formation of Interstitial compounds
- (iii) Formation of alloys.

29. Write the balance equation for the formation of the following from Cyanobenzene. 3

- (i) Benzoic acid
- (ii) Benzamide
- (iii) Benzylamine

30. Describe the distinction between Primary, Secondary and tertiary alcohols by Victor Meyer's test. 3

31. Define the following terms with an example for each : 3

- (i) Antihistamines
- (ii) Antioxidants
- (iii) Antifertility drugs.

Questions 32 - 34 are essay type carrying 5 marks each.

32. Define Corrosion and write the mechanism of rusting of iron. Give an example of antirust solution. 1+3+1=5

33. How is  $\text{NH}_3$  prepared from Calcium carbide and Alumina and Nitric acid manufactured by catalytic oxidation of Ammonia. 2+3=5

34. An aldehyde  $X$  gives  $A$  and  $B$  when heated with sodium hydroxide.  $A$  reacts with  $HBr$  and  $KCN$  and gives  $C$  while  $B$  reacts with cone  $HNO_3$  and  $H_2SO_4$  giving  $m$ -nitro benzoic acid but  $X$  gives  $Y$  when reacts with  $HCN/OH^-$ . Identify  $A$ ,  $B$ ,  $C$ ,  $X$  and  $Y$ .

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