

NORTH-EX PUBLIC SCHOOL

First Pre-Board (2019-20)

TIME allowed: 3 HOURS

CHEMISTRY(XII)

Max.Marks: 70

General Instruction:

- (a) All questions are compulsory.
 - (b) Section A: Q.no. 1 to 20 are very short answer questions and carry 1 marks each.
 - (c) Section B: Q.no. 21 to 27 are short answer questions and carry 2 marks each.
 - (d) Section C: Q.no. 28 to 34 are also short answer questions and carry 3 marks each.
 - (e) Section D: Q.no. 35 to 37 are long answer questions and carry 5 marks each.
 - (f) There is no overall choice. However an internal choice has been provided in two questions of two marks, two questions of three marks and all the three questions of five marks weightage. You have only one of the choices in such questions.
 - (g) Use log tables if necessary, use of calculator is not allowed.
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SECTION - A

Read the given passage and answer the question 1 to 5 that follow:

Copper is extracted from copper pyrites. After roasting, the ore is mixed with silica and coke and then smelted in a blast furnace. The matte obtained from the blast furnace is charged into a silica lined converter. Some silica is also added and hot air blast is blown into the mixture to obtain blister copper which is purified by electrorefining.

1. What is the chemical formula of copper pyrites.
2. Why copper matte is put in silica lined converter ?
3. Why coke is added during smelting?
4. What is the chemical composition of slag formed during smelting process ?
5. Differentiate between roasting and calcination.

Questions 6 to 10 are one word answers:

6. Name the substance used as depressant in separation of two sulphide ores in Froth floatation method.
7. Write the name and structure of the monomers of Nylon 6?
8. What are artificial sweetening agents? Give two examples.
9. Give reason for the higher boiling point of ethanol in comparison to methoxymethane.
10. Define reverse osmosis ?

Questions 11 to 15 are multiple choice questions:

11. When one mole of $\text{CoCl}_3 \cdot 5\text{NH}_3$ was treated with excess of silver nitrate solution, 2 mole of AgCl was precipitated. The formula of the compound is:
 (a) $[\text{Co}(\text{NH}_3)_5\text{Cl}_2]\text{Cl}$ (b) $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$
 (c) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2](\text{NH}_3)\text{Cl}$ (d) $[\text{Co}(\text{NH}_3)_3\text{Cl}_3](\text{NH}_3)_2$
12. The electronic configuration of gadolinium (At. No. 64) is
 (a) $[\text{Xe}] 4f^8 5d^0 6s^2$ (b) $[\text{Xe}] 4f^8 5d^0 6s^2$ (c) $[\text{Xe}] 4f^8 5d^0 6s^2$ (d) $[\text{Xe}] 4f^8 5d^0 6s^2$
13. The incorrect statement about LDP is:
 (a) It is obtained through the free radical addition of ethene.
 (b) It consists of linear molecules.
 (c) It is obtained by the H-Atom abstraction.
 (d) Peroxide is used as an initiator.
14. Which of the following group can act as ambidentate ligands?
 (a) CO_3^{2-} (b) CN^- (c) NO_2^- (d) en
15. Which one of the following arrangements does not truly present the property indicated against it?
 (a) $\text{Br}_2 < \text{Cl}_2 < \text{F}_2$: Electronegativity
 (a) $\text{Br}_2 < \text{F}_2 < \text{Cl}_2$: Electron affinity
 (a) $\text{Br}_2 < \text{Cl}_2 < \text{F}_2$: Bond energy
 (a) $\text{Br}_2 < \text{Cl}_2 < \text{F}_2$: Oxidizing power

Question 16 to 20:

(A) Both assertion and reason are correct statement, and reason is the correct explanation of the assertion.

(B) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.

(C) Assertion is correct, but reason is wrong statement.

(D) Assertion is wrong, but reason is correct statement.

16. **Assertion:** The two strands in double strand helix structure of DNA are complementary to each other

Reason: Disulphide bonds are formed between specific pairs of bases.

17. **Assertion :** Glucose react with hydroxylamine to form an oxime and also adds a molecule of hydrogen cyanide to give cyanohydrin.

Reason: The carbonyl group is present in the open chain structure of glucose.

18. **Assertion:** The acidic strength of halogen acids varies in the order $\text{HF} > \text{HCl} > \text{HBr} > \text{HI}$

Reason: The bond dissociation enthalpy of halogen acids decreases in the $\text{HF} > \text{HCl} > \text{HBr} > \text{HI}$

19. **Assertion :** C_2H_5OH is a weaker base than phenol but is a stronger nucleophile than phenol.
Reason: In phenol the lone pair of electrons on oxygen is withdrawn towards the ring due to resonance.
20. **Assertion:** Aryl halide undergo nucleophilic substitution reaction with ease.
Reason: The carbon halogen bond in aryl halides has partial double bond character.

SECTION - B

21. What are essential and non-essential amino acids? Give two examples of each type.

OR

Why are Vitamin A and C essential to us? Give their important sources.

22. Give one chemical test to distinguish between the following pairs of compounds:
 (i) Aniline and benzylamine,
 (ii) propanal and propanone.
23. Which and why 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
24. What are lyophilic and lyophobic sols? Give one example of each type. Why are hydrophobic sols easily coagulated?
25. Vapour pressure of pure water at 298K is 23.8 mm Hg. 50 g of urea (NH_2CONH_2) is dissolved in 850 g of water. Calculate the vapour pressure of water for this and its relative lowering.

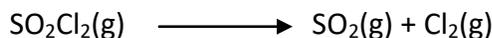
OR

Determine the osmotic pressure of solution prepared by dissolving 25 mg of K_2SO_4 in 2 litre of water at $25^\circ C$, assuming that it is completely dissociated.

26. Write the mechanism of acid dehydration of ethanol to yield ethene.
27. A 10% solution (by mass) of sucrose in water has freezing point of 269.15K. Calculate the freezing point of 10% glucose in water, if freezing point of pure water is 273.15 K.
 Given (Molar mass of sucrose = 342 g mol^{-1}) (Molar mass of glucose = 180 g mol^{-1})

SECTION - C

28. The following data were obtained during the first order thermal decomposition of SO_2Cl_2 at a constant volume.



Experiment	Time(s)	Total pressure(atm)
1.	0	0.5
2.	100	0.6

Calculate the rate of the reaction when total pressure is 0.65 atm.

OR

The time required for 10% completion of a first order reaction at 298K is equal to that required for its 25% completion at 308K. If the value of A is $4 \times 10^{10} \text{ s}^{-1}$. Calculate k at 318K and E_a .

29. Answer the following questions:

(a) Which of the following electrolyte is most effective for the coagulation of AgI/Ag⁺ sol?

MgCl₂, K₂SO₄, K₄[Fe(CN)₆]

(b) What happens when a freshly precipitated Fe(OH)₃ is shaken with a little amount of diluted solution of FeCl₃.

(c) out of sulphur sol and proteins, which one forms macromolecular colloids?

30. Give reasons for the following:

(i) Aniline does not undergo Friedal-Crafts reaction.

(ii) (CH₃)₂NH is more basic than (CH₃)₃N in an aqueous solution.

(iii) Primary amines have higher boiling point than tertiary amines.

31. (a) State Kohlrauschlaw of independent migration of ions?

(b) Why are powdered substances more effective adsorbents than their crystalline forms?

(c) State Henry's law.

32. Account for the following equations:

(i) Zn is not considered as a transition element.

(ii) Transition metals form a large number of complexes.

(iii) The E^0 value for the Mn³⁺/Mn²⁺ couple is much more positive than that for Cr³⁺/Cr²⁺ couple.

33. (i) How do antiseptics differ from disinfectants ? Give one example of each?

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

(iii) What is tincture of Iodine? What is its use?

OR

Give reason for the following:

(i) Bithionol is added to soap.

(ii) Metal hydroxide are better alternative than sodium hydrogen carbonate for treatment of acidity.

(iii) Problem arises in using alitame as artificial sweetener.

34. Give reason for the following :

(i) Phenol is more acidic than ethanol,

(ii) Boiling point of ethanol is higher in comparison to methoxymethane,

(iii) (CH₃)₃C-O-CH₃ on reaction with HI gives CH₃OH and (CH₃)₃C-I as main products not (CH₃)₃C-OH and CH₃I.

SECTION - D

35. (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 lead storage battery.

(b) Represent the cell in which the following reaction takes place $\text{Mg(s)} + 2\text{Ag}^+(0.0001\text{M}) \rightarrow \text{Mg}^{2+}(0.130\text{M}) + 2\text{Ag(s)}$ calculate its $E_{(\text{cell})}$ if $E^{\ominus}_{(\text{cell})} = 3.17\text{V}$.

OR

- (a) How many moles of mercury will be produced by electrolyzing 1.0 M $\text{Hg}(\text{NO}_3)_2$ solution with current of 2.00 A for 3 hours ? [$\text{Hg}(\text{NO}_3)_2 = 200.6 \text{ g mol}^{-1}$] .
- (b) A Voltaic cell is set at 25°C with the following half-cells Al^{3+} (0.001 M) and Ni^{2+} (0.50M). Write an equation for the following reaction that occurs when the cell generates an electric current and determine the cell potential.(Given: $E^\circ_{\text{Ni}^{2+}/\text{Ni}} = -0.25 \text{ V}$, $E^\circ_{\text{Al}^{3+}/\text{Al}} = -1.66 \text{ V}$)

36. (a) Account for the following observation:

- (i) Halogens have maximum negative electron gain enthalpy in the respective periods of the periodic table.
- (ii) Chlorine water is a powerful bleaching agent.
- (iii) H_2S is less acidic than H_2Te .
- (b) what happens when:
- (i) When HCl react with finely powdered iron.
- (ii) XeF_6 undergoes partial hydrolysis.(Give the chemical equations involved).

OR

- (a) What inspired N. Bartlett for carrying out reaction between Xe and PtF_6 ?
- (b) Arrange the following in the order of property indicated against each set:
- (i) F_2 , I_2 , Br_2 , Cl_2 (increasing bond dissociation enthalpy)
- (ii) HF, HCl, HBr, HI(increasing acid strength)
- (c) Complete the following equations:
- (i) $\text{Cl}_2 + \text{NaOH}$ (cold and dilute) \rightarrow
- (ii) $\text{Fe}^{3+} + \text{SO}_2 + \text{H}_2\text{O} \rightarrow$

37. (a) How will you convert:

- (i) Nitrobenzene to benzoic acid
- (ii) Benzene to m-bromobenzene
- (iii) Benzoic acid to aniline
- (b) Explain the following with an example.
- (i) Wolff-kishner reduction, (ii) Cannizzaro reaction.

OR

- (a) How will you convert:
- (i) Ethanoic acid into propanoic acid
- (ii) Methanamine into ethanamine
- (iii) Methanol into ethanoic acid
- (b) Explain the following with an example.
- (i) Aldol condensation, (ii) HVZ.