Instructions:
(1)   *Answer must be written either in English or the medium of instruction of the candidate in high school.*
(2)   *There will be no negative marking*
(3)   *Use of calculators or graph papers is not permitted*
(4)   *Answer all the questions. Each question carries 2½ Marks.*

1.   What is the action of heat on following salts? Explain with balanced equations.
      a) $FeSO_4 \xrightarrow{\Delta}$ b) $AgNO_3 \xrightarrow{\Delta}$

2.   Sugar forms clear solution but soap forms cloudy solutions. Why?

3.   What is the composition of baking powder? Explain how it bakes the bread to make it spongy? (with chemical equations)

4.   When iron is exposed to atmosphere surface of the metal becomes brown but silver under similar conditions becomes black. Explain with equations?

5. BH_3 acts as a Lewis acid whereas NH_3 acts as Lewis base. Explain with proper structures?

6.   Write the cathodic and anodic reactions when aqueous solution of KNO_3 is electrolysed by using Pt electrodes.

7.   What is electrolyte? What is the basic requirement for a substance to act as electrolyte?

8.   In the given salt cation is called as basic radical and anion is called as acid radical. Why?

9.   Why hydrogen peroxide acts as oxidising as well as reducing agent?

10.   Hardness of IA-group elements gradually decreases down the group. Why?

11.   What way thermochemical equations are more informative than skeletal and balanced chemical equations?

12.   What are the simplest tests that are used for identification of purity of the chemical sample?

13.   Total hardness of water cannot be removed by simple heating. Why?

14. CO_2 and SiO_2 are the oxides of elements of same group but CO_2 is a gas but SiO_2 is solid. Why?

15.   All exothermic reactions are not spontaneous reactions. Why?

16.   What are the internal factors that decide the physical state of the substance?

17.   Aqueous solution of $CuSO_4$ cannot be stored in Zn container but aqueous solution of $ZnSO_4$ can be stored in Cu vessel. Why?

18.   Match each of the chemical species in **Column I** with its property / properties given in corresponding **Column II** & **Column III.** No partial marking.

Column-I	Column-II	Column-III
a) BeH_2	1. sp^3d^2	(i) trigonal planar
b) CH_2BrCl	2. sp^3	(ii) octahedral
c) PF_6^-	3. sp^2	(iii) distorted tetrahedron
d) BF_3	4. sp	(iv) linear

19.   Ethanol (density=0.7893 g/ml) and water (density=0.9931 g/ml) at 25^0C are mixed in the volume ratio 1:2 to get solution of density 0.9571 g/ml. Calculate (i) the fractional change in volume and (ii) the molality of the final solution.

20.   Indicate whether the following reaction is exothermic or endothermic by properly computing the given data:

$$M_g + 2X_g \rightarrow M_g^{2+} + 2X_g^{-} \; ;$$

IE_1 of $M_g = 737.7$ Kj mol^{-1} ; IE_2 of $M_g = 1451$ Kj mol^{-1} ; EA_1 of $X_g = -328$ Kj mol^{-1}