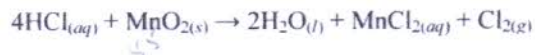


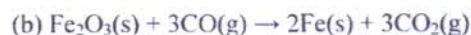
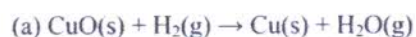
1. How is lattice enthalpy related with stability of an ionic compound ? 1
2. Calculate the mass of 0.1 mole of  $\text{KNO}_3$  . 1
3. Define oxidising agent. 1
4. Write chemical equations to show that  $\text{H}_2\text{O}_2$  behaves as oxidizing as well as reducing agent ? 1
5. What do you understand by photochemical smog ? 1
6. Gastric juice contains about 3g of  $\text{HCl}$  per litre. If a person produces about 2.5l of gastric juice per day, how many antacid tablets containing 400mg of  $\text{Al}(\text{OH})_3$  are needed to neutralize all the  $\text{HCl}$  produced in one day? 2

7. Chlorine is prepared in the laboratory by treating manganese dioxide ( $\text{MnO}_2$ ) with aqueous hydrochloric acid according to the reaction



How many grams of  $\text{HCl}$  react with 5.0 g of manganese dioxide?

8. Justify that the following reactions are redox reactions: 2



9. What do you understand by 'Autoprotolysis of water'? 2
10. What are the reactions involved for ozone layer depletion in stratosphere ? 2
11. What volume of oxygen at N.T.P is needed to cause the complete combustion of 200 mL of acetylene ? Also calculate the volume of carbon dioxide formed . 3
12. A 25 watt bulb emits monochromatic yellow light of wavelength of  $0.57\mu\text{m}$ . Calculate the rate of emission of quanta per second. 3

13. Considering the elements F, Cl, O and N, arrange them in the order of their increasing chemical reactivity in terms of oxidizing property.

OR

Define Electron Gain enthalpy . Would you expect the second electron gain enthalpy of O as positive, more negative or less negative than the first? Justify your answer. 3

14. (i) Discuss the shape of the following molecules using the VSEPR model:



(ii) Use molecular orbital theory to explain why the  $\text{Be}_2$  molecule does not exist. 3

15. Give reasons: 3

(i) Ice floats on water .

(ii) Free rotation is not possible in pi bonds .

(iii)  $\text{BeF}_2$  and  $\text{H}_2\text{O}$  are both tri atomic molecules but have different shapes .

16. Arrange the following : 3

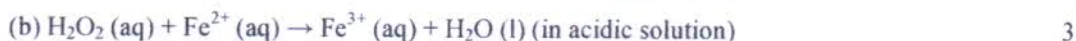
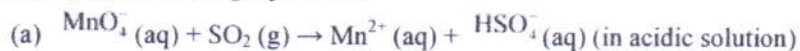
(i)  $\text{LiH}$ ,  $\text{NaH}$  and  $\text{CaH}$  in order of increasing ionic character .

(ii)  $\text{H-H}$ ,  $\text{D-D}$  and  $\text{F-F}$  in order of increasing order of bond dissociation enthalpy .

Give reason

17. A compound contains 4.07% hydrogen , 24.27% carbon, and 71.65% chlorine. Its molar mass is 98.96 g  
What are its empirical formula and molecular formula . 3

18. Balance the following equations :



19. Neon gas is generally used in the sign boards. If it emits strongly at 616 nm, calculate

(a) the frequency of emission, (b) distance traveled by this radiation in 30 s

(c) energy of quantum and (d) number of quanta present if it produces 2 J of energy. 3

OR

19. Nitrogen laser produces a radiation at a wavelength of 337.1 nm. If the number of photons emitted is  $5.6 \times 10^{24}$ , calculate the power of this laser. 3

20. The first ( $\Delta_1H$ ) and the second ( $\Delta_2H$ ) ionization enthalpies (in  $\text{kJ mol}^{-1}$ ) and the ( $\Delta_{\text{eg}}H$ ) electron gain enthalpy (in  $\text{kJ mol}^{-1}$ ) of a few elements are given below: 3

Elements	$\Delta_1H$	$\Delta_2H$	$\Delta_{\text{eg}}H$
I	520	7300	-60
II	419	3051	-48
III	1681	3374	-328
IV	1008	1846	-295
V	2372	5251	+48
VI	738	1451	-40

Which of the above elements is likely to be :

(a) the least reactive element.

- (b) the most reactive metal.
- (c) the most reactive non-metal.
- (d) the least reactive non-metal.
- (e) the metal which can form a stable binary halide of the formula  $MX_2$ , (X=halogen).
- (f) the metal which can form a predominantly stable covalent halide of the formula  $MX$  (X=halogen)?

21. (i) Write postulates of Plank's Quantum Theory . (ii) Define – Photo electric effect 3

22. (i) Give the structure of  $BeCl_2$  in solid phase . 1  
 (ii) Differentiate between Covalent radius and vanderWaal's radius. 2

23. A factory was started near a village . Suddenly villagers started feeling the presence of irritating vapours in the village and cases of headache , chest pain cough and breathing problems increased . Villagers blamed the emissions from the chimney of the factory for such problems . Explain what could have happened. Give chemical reactions for the support of your explanation. What is your view for such a problem and provide possible solution for such a problem ? 4

24. (i) Explain, giving reasons, which of the following sets of quantum numbers are **not** possible.

~~a~~  $n=0 \quad l=0 \quad m_l=0 \quad m_s=+\frac{1}{2}$

b  $n=1 \quad l=0 \quad m_l=0 \quad m_s=-\frac{1}{2}$

c  $n=1 \quad l=1 \quad m_l=0 \quad m_s=+\frac{1}{2}$

d  $n=2 \quad l=1 \quad m_l=0 \quad m_s=-\frac{1}{2}$

- (ii) Write the electronic configuration of  $Cr^{3+}$  (Atomic no. of Cr = 24)
- (iii) Derive deBroglie's equation .

5

OR

- (i) Arrange the following orbitals in the order of their increasing energies  
 $4s, 5p, 4d, 5s, 4f$ ,
- (ii) What are the limitations of Bohr's atomic model (Any Two)
- (iii) What happens to the kinetic energy of electrons when (i) the intensity of light falling on the metal surface is decreased (ii) frequency of light is increased .

5

25. Give reasons for the following :

- (i) The electron affinities of the halogens decreases in the order  $\text{Cl} > \text{F} > \text{Br} > \text{I}$
- (ii) Nitrogen has high first ionization enthalpy than oxygen.
- (iii) Ionic radius of  $\text{Al}^{3+}$  is smaller than that of  $\text{Al}$ .
- (iv) The increasing order of reactivity among group 1 element is  $\text{Li} < \text{Na} < \text{K} < \text{Rb} < \text{Cs}$  whereas that of group 17 is  $\text{F} > \text{Cl} > \text{Br} > \text{I}$
- (v) The second electron gain enthalpy of an element is positive. 5

OR

- (i) What are the various factors due to which the ionization enthalpy of the main group elements tends to decrease down a group?
- (ii) How would you explain the fact that the first ionization enthalpy of sodium is lower than that of magnesium but its second ionization enthalpy is higher than that of magnesium?
- (iii) Which of the following elements has most positive electron gain enthalpy?  
Give reasons for your answer. 5  
Flourine, nitrogen, neon.

26. (i) Which out of  $\text{NH}_3$  and  $\text{NF}_3$  has higher dipole moment and why?

(ii) Distinguish between a sigma and a pi bond

(iii) Draw energy level diagram for  $\text{N}_2$  molecule. (MOT) 5

OR

26. (i) Draw diagrams showing the formation of a double bond and a triple bond between carbon atoms in  $\text{C}_2\text{H}_4$  and  $\text{C}_2\text{H}_2$  molecules.

(ii) Compare the relative stability of the following species and indicate their magnetic properties:

$\text{O}_2^+$ ,  $\text{O}_2^-$  (superoxide),  $\text{O}_2^{2-}$  (peroxide) 5