Q1. State Dalton's Law of partial pressures ?

Q2. Explain the reason for the fusion of an organic compound with metallic sodium for

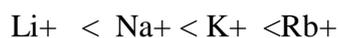Testing nitrogen, sulphur & halogens?

Q3. What would be the IUPAC name & symbol for the element with atomic number 120?

Q4. State first law of thermodynamics

Q5. State Hund's rule of maximum multiplicity?

Q6. Explain the following observations:-

(a)The mobilities of the following alkali metal ions in aqueous solutions are—

Li+ < Na+ < K+ <Rb+

(b) Be and Mg do not give colour to flame while other alkaline earth metals do so.

Q7. Calculate the amount of carbon dioxide that could be produced when 1 mole of carbon

is burnt in 16g of dioxygen.   C(s)   +   O2 → CO2 (g)

Q8. Which has more dipolemoment , NH_3 or NF_3 Why?

or

Discuss the shapes of the following molecules using VSEPR theory:
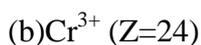
i) PCl5   ii) ClF3

Q9. An alkene on ozonolysis gives a mixture of ethanal and pentan-3-one? Write the structure and IUPAC name of the alkene. Also write the reaction involved?
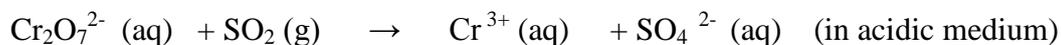
Q10.Write the electronic configuration of:-

(a)S^{2-} (Z=16)

(b)Cr^{3+} (Z=24)

Q11. (a) What is meant by disproportionation reaction? Give an example.

(b)Balance the following redox reactions by ion-electron method.

$Cr_2O_7^{2-}$ (aq) + SO_2 (g) → Cr^{3+} (aq) + SO_4^{2-} (aq) (in acidic medium)

Q12. A compound contains 4.07% of hydrogen,24.27% of carbon,and 71.65% of chlorine.It's molar mass is 98.96g.What are it's empirical and molecular formulas?

Q13. Hydrogen gas is obtained from natural gas by partial oxidation with steam according to the following endothermic reaction:

CH_4(g) + H_2O (g) ⇌ CO(g) +3 H_2 (g)
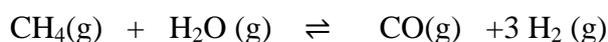
(a)Write an expression for Kp for the above reaction.

(b)How will the value of Kp be affected by:-

i) Increasing the pressure?

ii)Using a catalyst?

OR

(a) The concentration of H+ ion in a sample of soft drink is 3.8×10^{-3} M .What is its P^H

(b) What is common ion effect?

Q14.i) Write bond line structural formula of 2,3-dimethylbutanal.

ii) Give IUPAC names of :-

(a)$CH_3 - CH_2 - COOH$

(b) $CH_3 - CH_2 - CH(OH) - CH_2 - CHO$

Q15. (i) What causes temporary and permanent hardness of water?

(ii) How does H_2O_2 act as a bleaching agent?

(iii) What do you understand by the term "Water gas Shift Reaction"?

Q16 (i) State Paulis exclusion principle.
(ii) Using s,p,d,f notations, describe the orbital with the following quantum numbers:
a)n=4, l=0.   b)n=5, l=3
(iii) Explain Heisensberg s uncertainity principle.
Q17. (i) state Boyle's law? Write its mathematical form .

(ii) Calculate the total pressure in a mixture of 8g of oxygen & 4g of hydrogen confined in a vessel of 1 dm^3 at 27 ^{0}C. (R= 0.0833 bar dm^3 K-^{1} mol-^{1})   (2)

Q18.(a) Explain de-hydrohalogenation with a suitable example.

(b) In Sulphur estimation, 0.157g of an organic compound gave 0.4813g of Barium Sulphate .What is the percentage of sulphur in the compound?   (2)

Q19 (i) Arrange the following species
(3)

N^3, O^{2-}, F$^-$, Na$^+$, Mg^{2+}, & Al^{3+} in the order of increasing ionic radius.

(ii) Assign the position of the element having the following outer electronic configuration ns^2 np^4 for n=3

(iii) Which of the following pair of elements , F or Cl would have a more negative electron gain enthalpy &why?

Q20 (a)What is conjugate acid &conjugate base of H$_2$O?
(b)State Le-Chatelier''s principle.

(c) Define Buffer solution.

Q21(a) Define bond order   (3)

 (b) write its molecular orbital configuration of O$_2$ and O$_2$$^+$

 (c) Indicate the magnetic property of each of the above ion.

Q22 Explain the following observations:

(i) LiI is more soluble than KI in ethanol.

(ii) What happens when gypsum is heated at 125 ^{0}C

(iii) Pottasium Carbonate cannot be prepared by Solvay Process.

Q23. . Super dry cleaning owner Mr John was using tetrachloro ethane earlier as a solvent for drycleaning .The compound contaminates the ground water and also suspected carcinogenic .Mr Jindal owner of White tiger dry cleaning is using Co2 these days.Hydrogen peroxide is being used for bleaching purpose.

(a) What is the advantage of using liquid CO2?

(b) What is the advantage of using H2O2 as bleaching agent?

(c) What is your responsibility as human being to protect environment.

(d) What values are possessed by Mr Jindal.

Q24 .(a) State the second law of Thermodynamics. (1)

(b) State Hess law of heat summation.

(c) For the reaction : 2 A (g) +B(g) ------>2D (g) (3)
$\triangle U^0 = 10.5$ kJ   and $\triangle S^0 = -44.10$ J K^{-1}

Calculate the $\triangle G^0$ for the reaction and predict whether the reaction would occur spontaneously or not .

OR

(a) State First law of Thermodynamics.
(b) Give reason : The dissolution of ammonium chloride in water is endothermic still it dissolves in water .
(c) Ethylene (C_2H_4) on combustion gives CO_2, H_2O & its enthalpy of combustion is -1410 kJ mol^{-1} . If enthalpy of formation of CO_2(g) & H_2O (l) are -393.3 kL and -286.2 kJ respectively , calculate the enthalpy of formation of ethylene .
Q25 (i) What are silicones? How are they prepared? Give any two uses of it.

(ii) Explain the structure of Diborane.

(iii) How is producer gas different different from water gas?

OR

(i)   What is Borax? What changes occur when Borax is heated?
(ii)   Draw the structure of Al2Cl6. Why does it dimerise?
(iii)   Ionisation enthalpy of Gia is higher than that of Al. Why?

Q26. (a)Draw a newman projection formula for staggered & eclipsed conformation of ethane.   Which   of   the   two   is   more   stable   why?
b..(1) Write a reaction to illustrate Wurtz reaction. (1+1+1)

   (2) State Markoffnikovs rule.

  (3) State Huckels rule.

(d) Out of pentane &2,2- Dimethyl propane, which has higher boiling point & why? (1)

OR

(a) Explain the following with equation.
    (i)   Decarboxylation reaction..
    (ii)   Polymerisation.
    (iii)   Friedal craft s alkylation
    (iv)   Elimination reaction.
    (v)   Nitration of benzene.