S.6. chemistry revision test about s.4. work

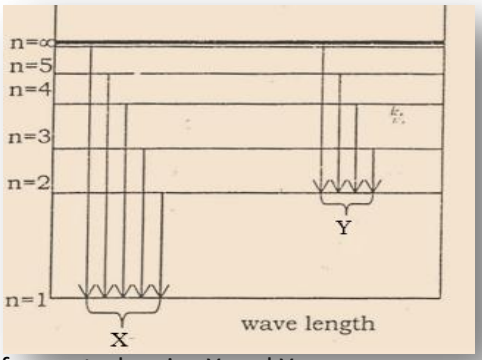
1.a. Define the term isotope.

b. A sample of boron with relative atomic mass of 10.8 gives a mass spectrum with two peaks at m/z =10 and one at m/z =11.

i. Calculate the heights of the peaks.

ii. Calculate the percentage abundance at each peak and sketch its mass spectrum.

2. The diagram below shows part of the series in the hydrogen spectrum.



i. Identify spectral series X and Y.

ii. Which of the two series gives rise to visible spectrum?

iii. What is the colour of the longest and shortest line in series Y

iv. Find the longest and shortest wavelength in the Y series. (R =109667cm^{-1})

3. The table below shows the first three values of ionisation energy for elements A and B in $kJmol^{-1}$

Element	1st IE	2nd IE	3rd IE
A	780	1500	7730
B	500	4560	6900

(a) Determine the group to which they belong and explain your answer.

(b) Write the equation of reaction between A and chlorine gas.

(C) Show the possible formula for the oxide of B.

4. Explain the following

a. P has a higher first ionization energy than S.

b. Phosphine(PH_3) has a lower boiling point than ammonia

c. Solubility of hydroxides of group ii elements all increase down the group.

d. A solution of $AlCl_3$ is acidic.

5. Complete the following table.

molecule	Bond angle	Name of shape	Structure of shape	hybridization
BH_3				
PCl_5				

6. Using a reagent carry out a chemical test to differentiate between the following pairs of ions. Include equations and observations for reaction.

a. SO_3^{2-} and SO_4^{2-}

b. Ba^{2+} and Ca^{2+}

7. Li is in group I and Mg is in group II but the two elements show similar chemical properties.

a. State the name of the relationship.

b. State 2 properties in which these two elements show similar properties.

c. Give two other pairs of elements that show that same relationship.

8. a. Using a diagram and equations that occur at the anode and cathode explain the process of purification of Al

b. A solution of aluminium was contaminated with iron iii ions. Outline how you would remove iron (iii) ions to leave a solution of aluminium free from this impurity. Describe the expected observation in case.

c. Give one application of Al

9 a. State the common oxidation states of group iv elements.

b. State how the stability of the oxidation states varies down the group.

c.i. Define inert pair effect.

ii. Using the tetrachlorides of lead explain the inert pair effect.

d. Explain why carbon tetrachloride is non polar yet its bonds are polar.

10. Write balanced equations of reaction between

a. conc. HNO_3 and C

b. conc HNO_3 and Cu

c. calcium phosphate and HNO_3

11. Using equations explain the contact process(manufacture of sulphuric acid)

12. a. state and explain how the oxidizing power of group seven element change down the group.

b. Write equations to show chlorine reacts with

i. water. ii. KBr iii. $FeCl_3$ iv. Cold NaOH

c. why is the reaction in b(i) called a disproportionation reaction

13. Complete the table below.

Element	Formula of oxide	Type of bonding
Al		
Si		
P		

b. Write the equations of reaction between the oxides of Si and P with water.

14. Define giving equations give examples.

a. Heat of formation

b. Standard heat of combustion

c. Lattice energy

14. a. Write the equation for the Haber process.

b. Explain what will happen to the equilibrium position if

i. pressure is increased.

ii. a catalyst is added.

iii. More H_2 is added

c. using example show how NH_3 acts a

i. lewis base

ii. Bronsted and lowry base.

15.a. Explain why potassium permanganate

i. is not acidified by HCl ii. does not need an indicator during titration

b. i. Complete balancing the following equations of reaction

$BiO_3^- + Mn^{2+} \rightarrow Bi^{3+} + MnO_4^-$

ii. The above equation is a chemical test to test the presence of Mn^{2+}

State what is observed