

1. (a) Define a radical

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(b) For each of the following radicals, write the formula and the valence

Radical	Formula/ion	Valence
Nitrate		
Phosphate		
Sulphate		
Hydrogen carbonate/Bicarbonate		
Carbonate		
Hydrogen sulphate		
Oxide		
Fluoride		
Peroxide		
Nitride		
Hydroxide		
Nitrite		
Iodide		
Ammonium		
Chloride		
Chlorate		
Permanganate		

2. Write the formula of the following compounds

(a) Magnesium hydrogen carbonate

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- (b) Barium nitrate
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- (c) Sodium hydroxide
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- (d) Calcium carbonate
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- (e) Potassium chlorate
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- (f) Barium sulphate
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- (g) Ammonium sulphate
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- (h) Potassium iodide
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- (i) Sodium hydrogen carbonate
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- (j) Lead (ii) chloride
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- (k) Sodium sulphate
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- (l) Potassium permanganate
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- (m) Calcium phosphate

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(n) Hydrogen peroxide
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(o) Sodium carbonate
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(p) Aluminium oxide
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(q) Triiorn tertraoxide
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(r) Sodium peroxide
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(s) Dinitrogen oxide
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(t) Carbonmonoxide
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(u) Carbondioxide
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(v) Ammonia
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(w) Methane
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(x) Ethanol
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(y) Ethene

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(z) Sodium oxide

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3. Write a well balanced equation for the reaction of;

(a) Sodium and excess oxygen

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(b) Calcium and water

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(c) Heated magnesium ribbon and carbondioxide

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(d) Zinc and oxygen

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(e) Sodium and water

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(f) Sodium oxide and water

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(g) Sodium peroxide and water

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(h) Heated iron and chlorine

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(i) Heated iron and hydrogen chloride gas

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- (j) Magnesium and copper (ii) sulphate solution

- (k) Heated anhydrous iron (ii) sulphate

- (l) Heated mixture of ammonium chloride and calcium hydroxide

4. For each of the following reactions, write the ionic equation.

- (a) Sulphuric acid and potassium hydroxide

- (b) Potassium carbonate and nitric acid

- (c) Sodium sulphate and lead (ii) nitrate

- (d) Lead (ii) nitrate and potassium iodide

- (e) Silver nitrate and sodium chloride

- (f) Copper (ii) nitrate and sodium carbonate

- (g) Calcium nitrate and sodium sulphate

- (h) Sodium chloride and lead (ii) nitrate

(i) Heated mixture of ammonium chloride and potassium hydroxide

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(j) Ammonium chloride and silver nitrate

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5. (a) Calculate the mass of lead (ii) nitrate that contains the same number of moles as 2.64g of copper (ii) nitrate. (Pb=207, N=14, O=16, Cu=64)

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6. 2.42g of zinc carbonate was strongly heated in a hard glass tube

(a) State what was observed

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(b) Write an equation for the reaction

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(c) Calculate the volume of the gas evolved at room temperature (Zn=65, O=16, C=12, molar gas volume at room temperature is 24000cm³)

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7. (a) Explain what is meant by the terms

(i) Mass number

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(ii) Atomic number

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(b) An atom of an element is represented by the symbol



(i) State the mass number of the atom

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(ii) What is the atomic number of the atom?

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(iii) How many neutrons are present in the atom?

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8. The positions of the elements A, B, C, E and F are shown the periodic table below. These letters are not the usual symbols for the elements.

	I	II									III	IV	V	VI	VII	VIII
2	A															
3	F											E		C	D	
4		B														
5																
6																

(a) State the type of bonding in the compound formed between

(i) B and D

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(ii) E and C

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(b) (i) Which one of the elements A and B reacts vigorously with cold water?

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(ii) Write the equation for the reaction between water and the element you have stated in b(i) above.

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(c) From the table, select two elements that can oxidize F.

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9. Part of the periodic table indicating positions of elements W, X and Z is shown below.

	I	II	III	IV	V	VI	VII	VIII
2								

3	W		X				Z	
4								
5								

- (a) (i) Write the formula of the oxide of W.

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- (ii) The oxide of W was dissolved in water. State whether the resultant solution is acidic, neutral or alkaline. Explain your answer.

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- (b) Write the formula of the compound between X and Z

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- (c) Which one of the atoms W, X and Z has the largest atomic size/radius?

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10. The number of electrons, protons and neutrons in atoms A, B, C and D are shown below

Atom	Electrons	Protons	Neutrons
A	8	8	8
B	16	16	16
C	13	13	14
D	3	3	4

- (a) Determine;

- (i) The value of x.

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(ii) The approximate relative atomic mass of C.

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(b) Write the electronic configurations of the following atoms and ions.

(i) A^{2-}

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(ii) A

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(iii) C

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(iv) C^{3+}

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(c) State two atoms that are of elements in the same group of the periodic table.

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11. The atomic number of element Q is 13

(a) Write the electronic configuration of an atom of Q

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(b) To which group of the periodic table does Q belong?

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(c) State whether Q would conduct electricity or not.

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(d) (i) Write the formula of the oxide of Q

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(ii) State the type of bonding in the oxide of Q.

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12. Part of the periodic table is shown below. The letters are not the usual symbols for elements.

I	II		III	IV	V	VI	VII	VIII
							T	
P	Q			S			U	
							W	V

(a) Which one is the least reactive element?

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(b) Which one of the elements T, U and W reacts most vigorously with Q?

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(c) Write the formula of the compound formed between Q and S.

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(d) The compound formed between P and W was dissolved in water. State whether the resultant solution was acidic, basic or neutral.

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(e) Which of the two elements represented in the table can react as reducing agents?

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13. Element X and Y with atomic numbers 12 and 8 respectively react to form a compound W.

(a) Write the electronic configuration of

(i) X

(ii) Y

(b) State whether W is

(i) A gas, liquid or solid at room temperature.

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(ii) Covalent or ionic

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14. Part of the periodic table is shown below

I	II		III	IV	V	VI	VII	VIII
A								
				C		D		
B	F					E		

(a) Write the formula of the compound formed between:

(i) D and C

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(ii) E and F

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(b) (i) Which one of the following elements A and B reacts more vigorously with water?

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(ii) Write an equation for the reaction between water and the element you have identified in (i).

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15. Figure below shows part of the periodic table, The letters used are not the correct symbols

I							VIII
	II	III	IV	V	VI	VII	
			P		T	R	
S							Q

(a) Which of the elements are metals?

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(b) Suppose element P reacts with element T,

(i) Write the formula of the compound formed between P and T

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(ii) What would be the type of bond formed between P and T?

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(c) (i) Which element in the periodic table is least reactive?

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(ii) Explain your answer in C(i) above.

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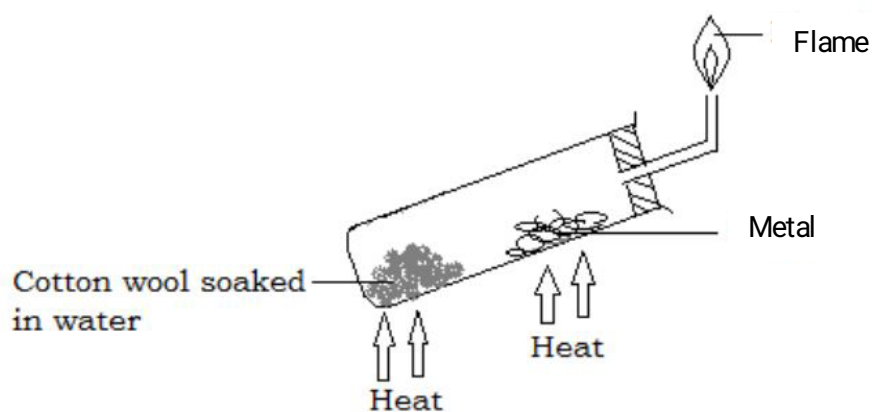
(d) (i) Suggest a compound formed between any two elements shown, which would conduct electricity.

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(ii) Give a reason for your answer in d(i).

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16. Figure below shows a set up of apparatus to investigate the reaction between metals and steam.



- (a) Suggest a suitable metal that could be used in the experiment.

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- (b) (i) What would be observed in the glass tube?

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- (ii) Write the equation for the reaction in the test tube.

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- (c) (i) Suggest the gas that is being burnt at the end of the tube.

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- (ii) Write the equation for the combustion of the gas in c(i).

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17. Use the data in the table below to answer the questions that follow.

Substance	Melting point (°C)	Boiling point (°C)	Solubility in water	Electrical conductance		Density at room temp
				Solid form	Molten form	
A	714	1418	V	None	Good	2.3 g/cm ³
B	- 95	56	V	None	None	0.8 g/cm ³
C	1083	2580	I	Good	Good	8.9 g/cm ³
D	- 101	- 34	V	None	None	2.55 g/cm ³
E	- 23	77	I	None	None	1.6 g/cm ³
F	- 219	- 11	S	None	None	1.33 g/cm ³

V = very soluble; S = Slightly soluble; I = Insoluble

- (a) (i) Name two substances that are liquids at room temperature

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- (ii) Which of the two is more volatile?

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- (b) Which substances would dissolve in water and could be separated from the solution by

- (i) Fractional distillation?

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- (ii) By evaporation of the water?

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- (c) Which of the substances A to F,

- (i) Has a structure consisting of ions?

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- (ii) Is a metal?
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- (iii) Is a liquid which would form separate layers with water?
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.....
- (iv) Would the water be above or below?
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- (d) Which substance is a gas which
- (i) Would not be collected efficiently over water.
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- (ii) Would be collected efficiently over water.
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18. An atom X of an element, atomic mass 31 contains 15 protons.

- (a)