SCIENCE CENTRE

END OF JULY TEST EXAM 2021

S.3 CHEMISTRY

DURATION: 2 hours

TOPICS: ATOMIC STRUCTURE, BONDING, CARBON AND ITS COMPOUNDS.

1. (a) Define the following terms;

(i) An atom

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……

(ii) Atomic number

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……

(iii) Ionic bond

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……

(iv) A cation

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(b) (i) In the space below, draw a well labelled diagram of an atom, showing the location of the 3 fundamental particles

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(ii) Use the diagram above to explain why the nucleus of an atom is positively charged

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(c) In the space provided below; draw the electronic structure and write electronic configuration of the following

(i) Magnesium atom (Mg)

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……

(ii) Oxide ion (O^{2-})

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……

(iii)Sodium ion (Na^{+})

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……

2. The number of electron, protons, and neutrons in the atoms of the elements x, y, z and v are shown below

Atoms	Electrons	Protons	Neutrons
W	8	8	8
X	13	13	14
Y	16	16	16
z	P	11	11
V	8	Q	16

   a. Determine the value of;
      i. P……..
      ii. Q ……
   b. State the mass number of atom C
   c. Indicate with a reason, which atoms are;
      i. Isotopes ……
         Reason
         …….
      ii. Belong to the same group in the periodic table.
         ……
         Reason
         ……
   d. Write the electronic configuration of ;
      (i) Atom C …….
      (ii) Ion of A ……
      (iii)Ion of B ……..

3. Given the table below.

Element	Atomic number
X	5
Y	8
Z	11
W	17
q	12

   a. Write the formula of the compound formed when;
      (i) X reacts with W …….
      (ii) Y reacts with Z ……..

(iii)W reacts with Y……..

b. State the type of bonding;
   (i) In each of the compounds in (a) (i) above
   ……
   ……
   ……
   (ii) Between atoms of Q
   ……
   (iii)Between atoms of W
   ……

c. Use diagrams, show with only outer most energy levels how bonding occurs when;
   (i) Z reacts with Y
   ……
   ……
   ……
   ……
   ……
   ……
   ……
   (ii) W reacts with W
   ……
   ……
   ……
   ……
   ……
   ……
   ……

4. Given part of the periodic table below.

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

(a) State which element;
   (i) Is the most reactive
   ……
   (ii) Has the largest atomic radius
   ……
   (iii)Has the highest melting point
   ……
   (iv)Reacts by gaining 3 extra electrons to attain stability
   ……

(b) State the type of bonding involved in formation of;
   (i) Oxide of Q ……..
   (ii) Nitride of T ……

(iii)Chloride of P ……..

(c) Write the formula of;

(i) Oxide of W ……..

(ii) Carbonete of Q ……

(iii)Hydroxide of V ……

(iv)Chloride of S …….

5. (a) Define the term;

(i) Allotropy

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(ii) Isotopy

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……

(b) What are the 3 allotropes of carbon?

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……

(c) State three differences between graphite and diamond.

Graphite	Diamond

(d) Explain the suitability of graphite and diamond in the following.

(i) Graphite is used in making pencil lids.

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……..……..

(ii) Diamond is used in cutting glasses and rocks.

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(e) (i) Draw a well labelled diagram of the set up of apparatus that can be used to prepare a dry sample of carbon dioxide in the laboratory.

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(iii) Write the equation for the reaction that occur in the flask above.

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(f) Explain why carbon dioxide is

(i) Dried as above

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(ii) Collected as shown above

……..

(g) Describe the chemical test for carbon dioxide in the laboratory.

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6. (a) State four physical properties of oxygen.

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(b) State any four types of oxides.

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……

(c) What is the percentage of oxygen in air

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(d) State the type of oxide below

(i) Carbon dioxide …….
(ii) Copper (ii) oxide ……..
(iii)Water …….
(iv)Lead (ii) oxide …….

(e) Write equations for the reaction that occur when the following elements react with oxygen.

(i) Sodium

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……

(ii) Magnesium

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(iii)Calcium

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……

(iv)Potassium

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……

(v) Carbon

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……

(f) Complete and balance the following equations.

(i) $HCl_{(aq)} + NaOH_{(aq)} \longrightarrow$

(ii) $CaCO_{3(s)} \xrightarrow{\text{heat}}$

(iii) $Fe_{(s)} + Cl_{2(g)} \longrightarrow$

End