June Exemplar	**Natural Science[Physics]**	HOLY CROSS HIGH SCHOOL
Grade 9	**June Examination 2020**	

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Moderators:

This paper consists of 5 pages.

Section A:

Question 1

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter next to the question number on your answer sheet.

1.1.1 Elements in group one of the periodic table are called…

    A Halogens
    B Alkali Earth metals
    C Noble gases
    D Alkali metals   (2)

1.1.2 The valency of Boron is…

    A -2
    B +2
    C -3
    D +3   (2)

1.1.3 Which of the following best describes how to determine the amount of neutrons in an atom?

    A Neutrons = Protons
    B Neutrons = Protons - Electrons
    C Neutrons = Atomic mass - Protons
    D Neutrons = Atomic mass – Protons - Electrons   (2)

1.1.4 The element with an atomic mass number of 16 is…

    A Potassium
    B Sulfur
    C Oxygen
    D Gold   (2)

1.1.5 The correct chemical formula for sulfuric acid is….

    A H_2SO_4
    B HNO_3
    C HCl
    D H_2SO_3 (2)

1.1.6 An element in Period 4 and Group 1 of the Periodic table is classified as a…

    A Metal
    B Non-metal
    C Halogen
    D Noble gas   (2)

1.1.7   Which of the following is the correct balance equation for the reaction
        between magnesium and oxygen?

        A $Mg + O \longrightarrow MgO$
        B $2Mg + O \longrightarrow Mg_2O$
        C $Mg + O_2 \longrightarrow MgO_2$
        D $2Mg + O_2 \longrightarrow 2MgO$ (2)

1.1.8   A positively charged particle in an atom is…

        A A proton
        B An electron
        C A neutron
        D A positron   (2)

1.1.9   The chemical symbols (in order) used for potassium, calcium and sodium
        are…

        A K, Ca, S
        B K, Ca, So
        C P, Ca, S
        D K, Ca, Na   (2)

1.1.10 What is the colour of the flame when Sulfur burns in oxygen?

        A Purplish-blue
        B Green
        C Bright white
        D Orange   (2)

                                                                              [20]

SECTION B   MATTER AND MATERIALS
Question 2

2.1   *Sodium is a soft metal which is very reactive in water. It has an atomic
      number of 11 and a mass number of 23.*

2.1.1 How would you store sodium?   (1)

2.1.2 Draw an orbital model diagram showing the electron configuration for a
       sodium atom. Do this by drawing circular orbitals around a small positive
       nucleus, and indicating the electrons by dots on the orbitals.   (3)

2.1.3 How many valence electrons are there in each sodium atom?   (1)

2.1.4 a) How many neutrons are there in each sodium atom?   (1)
       b) How many protons are there in each sodium atom?   (1)

2.1.5 Is this atom neutral? Explain your answer.   (3)

2.2   *When sodium reacts with oxygen, sodium oxide is formed.*

2.2.1   What is the colour of the flame in this reaction?   (1)

2.2.2   Describe the product by referring to the colour and phase.   (2)

2.2.3   Write a balance equation to represent this reaction.   (4)
[17]

Question 3

3.1   Complete the following general reaction:
Non-metal + Oxygen $\longrightarrow$ (1)

3.2   Name the following compounds:
3.2.1 $MgBr_2$ (1)
3.2.2 $Ca(OH)_2$ (1)

3.3   Give the chemical formula for each of the following:
3.3.1   Potassium sulfate   (2)
3.3.2   Calcium chloride   (2)

3.4   Consider the compound $Cu(NO_3)_2$.
3.4.1   How many different elements are represented?   (1)
3.4.2   How many atoms are there in one molecule of this compound?   (1)

3.5   Rewrite and balance the following equations:
3.5.1 $Fe + O_2 \longrightarrow Fe_2O_3$ (2)
3.5.2 $P + O_2 \longrightarrow P_2O_5$ (2)
[13]

Question 4

When steel is exposed to oxygen and moisture it rusts. Kate and Finlay did an experiment to determine if this in fact true. They took three identical nails of known mass and put them in equal sized containers. Each container had the same amount of water. They observed the changes that took place in each container and measured the mass of the nails once a week for five weeks. They recorded the average mass in the table below.

Table showing the average mass of nails in water over a five week period.

Time (week)	Mass of nail (g)
0	23
1	22
2	20
3	17
4	13
5	8

4.1.1   Use the graph paper provided and draw a LINE GRAPH to represent these results.   (6)

4.1.2   What is the independent variable in this investigation?   (1)

4.1.3   Name two fixed variables in this investigation?   (2)

4.1.4   How can rusting of steel be prevented?   (1)
                                                                                                                    [10]
                            Total Section B = 40

                            TOTAL = [Paper Total =60]