HILLCREST HIGH SCHOOL

GRADE 9 NATURAL SCIENCE EXAMINATION

DECEMBER 2015

Time: 2 hours **Marks: 150**

INSTRUCTIONS:

- ✓ Please write neatly and legibly.
- ✓ Answer ALL the questions.
- ✓ Non-programmable calculators may be used.
- ✓ Number your answers exactly as they are numbered in this question paper.
- ✓ Use your time well.
- ✓ Round off to two decimal places.
- ✓ Answer all multiple choice questions by choosing the most correct answer. Only write the number and the correct answer in your answer booklet. E.g. 1.1 D

Formulae:		
$E_p = mgh$	$E_k = ½ mv^2$	$E_{mechanical} = E_p + E_k$
$W = m.g$	$g = 9,8\ m.s^{-2}$	$R = V/I$

Question 1 Multiple choice questions: Only write the letter of the correct option

1.1. The scientific name for elements in group one is _____
- A. Alkali- earth metals.
- B. Noble gases
- C. Alkali metals
- D. Transition metals

1.2. The electrons in the highest energy level are called_____
- A. Core electrons.
- B. Valence electrons.
- C. Electron configuration.
- D. Valency

1.3. Lemons have the pH of 4,5. Lemons can be classified as_____
- A. Neutral.
- B. Sour.
- C. Acidic.
- D. Alkaline.

1.4. When sodium hydroxide is added to a solution of hydrochloric acid and universal indicator the solution becomes green. This is an example of _____

A. Decomposition reaction.
B. Neutralisation reaction.
C. Synthesis reaction.
D. Redox reaction.

1.5. _____ is an example of a non-contact force.

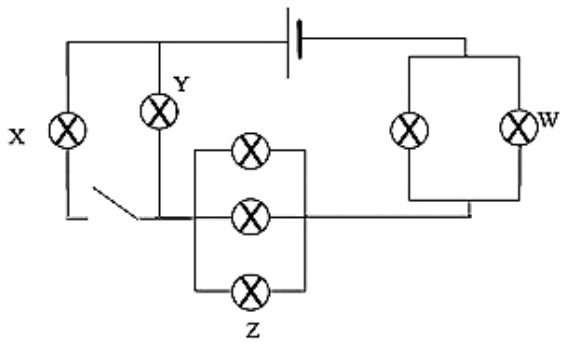
A. Friction.
B. Mass
C. Weight
D. Tension.

1.6 Bob is 60 kg and Lilly is 45 kg the both sitting in two opposite ends of the see-saw. The two forces that are exerting are _____

A. Balanced forces.
B. Unbalanced forces.
C. Gravity.
D. Stronger forces

1.7 In the diagram on the right, bulbs W, X, Y and Z are identical. Which bulb will be the brightest when the switch is open?

A. W
B. X
C. Y
D. Z



1.8. What is the rate of flow of electric charge?

A. Resistance
B. Current
C. Voltage
D. Power

1.9. The capacity of an object to perform or do work is _____

A. Kinetic energy
B. Potential energy
C. Mechanical energy
D. Light energy

1.10 Light is an example of _____

A. Transverse wave
B. Longitudinal wave
C. Microwaves
D. Energy

[2 x 10 = 20]

Question 2
Study the portion of the Periodic Table below and answer the questions that follow.

H 1 311						He 2 372
Li 520	Be 899	B 801	C 1 086	N 1 402	O 1 314	F 1 681	Ne 2 081
Na 496	Mg 738	Al 578	Si 786	P 1 012	S 1 001	Cl 1 251	Ar 1 521
K 419	Ca 590						

2.1. Identify the elements that are described in the statements below. Write only the name and not the symbol:

2.1.1. non- reactive element in period 2. (2)

2.1.2. a halogen in period 2. (2)

2.1.3. used in balloons (2)

2.1.4. a symbol for a diatomic gas in group 6. (2)

2.2. 1 Write the formula for potassium sulphate (2)

2.2.2. Write the name for the compound $CuSO_4$ (2)

[12]

Question 3

3.1 When sodium metal is placed in water the following reaction takes place:
sodium + water → hydrogen + sodium hydroxide

Write the question numbers (3.1.1 – 3.1.7) and the missing information for each substance on your answer paper. One substance in each column is completed for you as an example.

SUBSTANCE	ELEMENT / COMPOUND	Elements that make up the substance	Symbol or formula
sodium	element	sodium	*3.1.6*
water	*3.1.1*	*3.1.2*	H_2O
hydrogen	*3.1.3*	hydrogen	H
sodium hydroxide	*3.1.4*	*3.1.5*	*3.1.7*

(10)

3.2 Write a balanced chemical equation (symbolic equation) for the reaction in 3.1. (4)

3.3. Write a chemical equation to explain how acid rain is formed. (3)

3.4. Complete the following chemical reactions:

3.4.1. HCl +_____ → CaCl + _____ + _____ (3)

3.4.2. Metal Oxide + Acid → _____ (1)

3.4.3. HCl + Cu →_____ + H_2 (2)

[25]

Question 4

4.1. Define a force. (2)

4.2. Identify whether each of the following are contact or non-contact forces:

4.2.1	4.2.2	4.2.3	4.2.4
			

(4)

4.3. Define what a non-contact force is and list the three types of non-contact forces. (4)

4.4. What is the other term used for non-contact forces? (1)

4.5. What is the difference between mass and weight? (2)

4.6. Calculate the weight of a man with a mass of 65kg on Earth. (2)

[20]

Question 5

5.1 What is the difference between a cell and battery? (2)

5.2 Explain what the following two instruments measure and draw the symbol for each.
5.2.1 Voltmeter
5.2.1 Ammeter
(4)

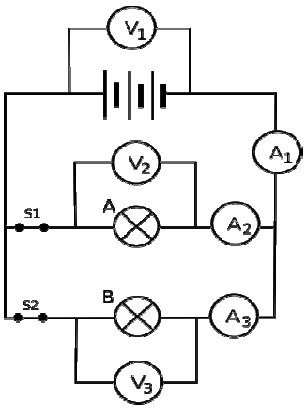
5.3 List the four factors that affect resistance in a circuit? (4)

5.4 Draw a circuit diagram showing the following elements:
three cells of 1,5V each connected in series with an ammeter and then two identical light bulbs connected in parallel. Show a voltmeter connected across one of the bulbs and an open switch breaking the circuit for the **other** bulb.
(5)

5.5 If the two light **bulbs in the circuit above were now connected in SERIES**, would they glow BRIGHTER, DIMMER or THE SAME as when connected in parallel? Give a reason for your answer. (2)

5.6 Study the circuit diagram below and work out the readings for ;
NB: ALL BULBS ARE IDENTICAL

5.6.1 V2
5.6.2 V3
5.6.3 A3



V1 = 9 V

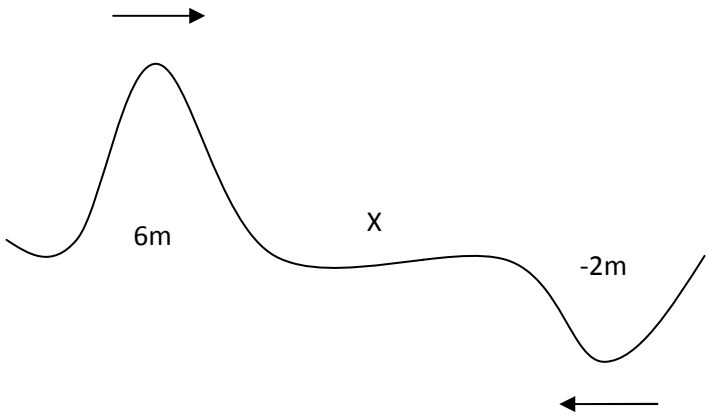
A1 = 6 A

A2 = 2 A

(3)
[20]

Question 6

6.1 Look at the diagram below and answer the questions that follow.



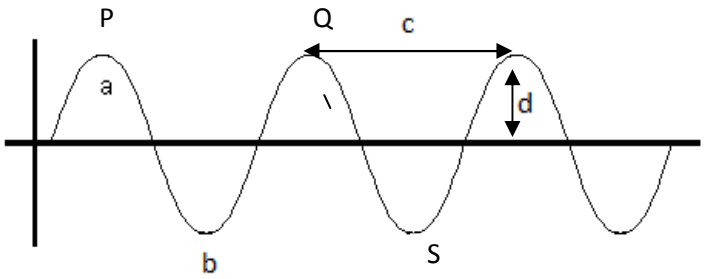
6.1.1 State the principle of superposition. (2)

6.1.2 Using the principle of superposition, explain what will happen in the above example where two pulses meet from opposite directions. What will happen after the interference? (Use drawing of waves to illustrate your answer and show all working out) (4)

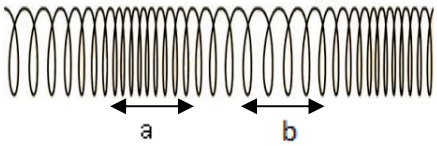
6.1.3 Is this an example of destructive or constructive interference? Motivate your answer. (3)

6.2 Look at the waves below:

Wave A



Wave B



6.2.1 What type of wave is wave A? (1)

6.2.2 What type of wave is wave B? (1)

6.2.3. Identify the points in phase for wave A (1)

6.2.4. Identify points out of phase (1)

6.2.5 What is the difference between the two types of waves? Include an example for each in your answer. (4)

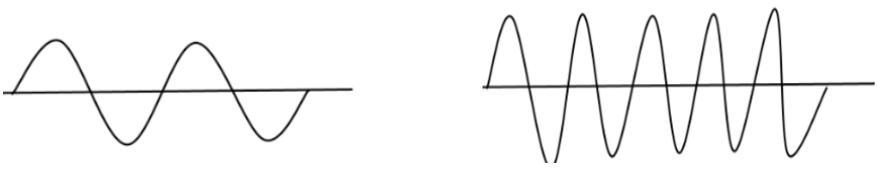
6.2.6 Label the features a, b, c and d on Wave A. Write down the letter and the correct term. (4)

6.2.7 Define the term "frequency". (2)

6.2.8 Label the features **a** and **b** on Wave B. Write down the letter and the correct term. (2)

6.2.9 Define the term "pitch of sound". (1)

6.2.10 Identify the wave with the higher pitch from the waves below.



X Y

(1)

[27]

Question 7
Match the term in column A with its correct definition in Column B. Write only the question number and the letter of the correct answer.

Column A		Column B	
7.1	Electric potential energy	A	Energy an object possesses because of its motion
7.2	Gravitational potential energy	B	Energy gained by molecules during phase change
7.3	Elastic potential energy	C	Energy of a charged object due its position relative to other charges
7.4	Potential energy during phase change	D	Energy stored in a compressed or extended spring
7.5	Kinetic energy	E	Energy an object possess due to its position above the ground

(5)

7.6 A brick with a mass of 1kg is lifted to the top of a 4m high roof. It slips off the roof and falls to the ground. Calculate the gravitational potential energy of the brick when it is at the top of the roof. (3)

7.7 A netball player, who is 1.7m tall, holds a 0.5kg netball 0.5m above her head and shoots for the goal net which is 2.5m above the ground. What is the gravitational potential energy of the ball:

7.7.1 when she is about to shoot it into the net, before it leaves her hand? (4)
7.7.2 when it gets right into the net? (3)
7.7.3 when it lands on the ground after the goal is scored? (3)

7.8 Calculate the kinetic energy of a car that travels at a speed of 20m/s and has a mass of 1200 kg. (3)

7.9 Calculate the velocity of a Wii remote flung from a hand through a TV, with a kinetic energy of 1.44J and a mass of 4.5kg. (6)

7.10 Calculate the total mechanical energy for a ball with a mass of 0.15kg that has a kinetic energy of 20J and is 2m above the ground. (3)

[30]

ERRATUM

Please write the following erratum on the board before the exam commences:

7.9 Calculate the velocity of a Wii remote flung from a hand through a TV, with a kinetic energy of 1.44J and a mass of 4.5kg.

should say

7.9 Calculate the velocity of a Wii remote flung from a hand through a TV, with a kinetic energy of 1.44J and a mass of **0.2kg.**

Thank you.

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