

HILLCREST HIGH SCHOOL



NATURAL SCIENCE EXAM

GRADE 9

TIME : 2 HRS

EXAMINER: MRS SMITH

MODERATOR: MRS KNOX-WHITEHEAD

JUNE 2019

TOTAL : 120

INSTRUCTIONS

1. This question paper consists of 14 pages and 4 sections A – D
 2. Answer all of the questions from SECTIONS A to D in the ANSWER BOOK provided.
 3. Non-programmable calculators may be used.
 4. Number the answers correctly according to the numbering system used in this question paper
 6. Give brief motivations, discussions, et cetera where required.
 7. Write neatly and in pen.
 8. RULE OFF after each question 1 – 13.
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SECTION A : LIFE AND LIVING

[20]

QUESTION 1: MULTIPLE CHOICE QUESTIONS

[10]

Four options are provided as possible answers to the following questions. Each question has only one correct answer. Write only the letter (A-D) next to the question number (1.1 – 1.10) in the answer book.

- 1.1 The structure of the microscope that controls the amount of light directed onto the specimen is the
- A. rotating nose piece
 - B. mirror
 - C. diaphragm
 - D. ocular
- 1.2 Which of the following structures is found in a plant cell but not in an animal cell?
- A. cell wall
 - B. DNA
 - C. ribosome
 - D. cell membrane
- 1.3 Peristalsis occurs when
- A. digested food is absorbed by the intestines
 - B. food is pushed along the alimentary canal
 - C. glucose is stored in the liver
 - D. the stomach secretes acids and enzymes to digest food
- 1.4 Which of the following is a disease caused by a lack of food?
- A. Rickets
 - B. Marasmus
 - C. Osteoporosis
 - D. Kwashiorkor
- 1.5 The organ that transports gases from the back of the throat to the lungs is the
- A. trachea
 - B. bronchus
 - C. larynx
 - D. oesophagus

1.6 Bones are attached to bones by means of

- A. triceps
- B. ligaments
- C. biceps
- D. tendons

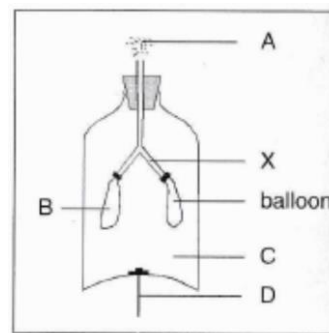
1.7 The stomach is directly connected to the

- A. liver and gall bladder
- B. small intestines and large intestines
- C. oesophagus and small intestines
- D. oesophagus and pancreas

1.8 Study the picture to the right.

When D is lowered the balloon will inflate because:

- A. The pressure in B is the same as in C
- B. The volume of C is decreased
- C. The pressure in B is less than in A
- D. The pressure in C is increased



1.9 Which of the following is NOT part of the human breathing system?

- A. Bronchus
- B. Intercostal muscles
- C. Lungs
- D. Heart

1.10 Pregnancy begins when

- A. Sexual intercourse takes place
- B. An ovum is fertilized
- C. A zygote becomes embedded in the uterus
- D. An ovum is released from an ovary

QUESTION 2 : TERMINOLOGY

[10]

Give one word / term that best describes the following statements.

- 2.1 The organelle in the cell where water and dissolved nutrients are most likely found.
- 2.2 Outer boundary of a plant cell.

- 2.3 What we call a group of similar cells that perform the same function.
- 2.4 A 'message' carried by a nerve cell to and from the brain.
- 2.5 Liquid tissue of the circulatory system.
- 2.6 The organ enclosed by the scrotum.
- 2.7 The partially digested food found in the stomach.
- 2.8 The discharge of blood and the lining of the uterus every 28 days, if fertilization has not occurred.
- 2.9 The cord that connects the foetus to the placenta.
- 2.10 A sexually transmitted virus that causes AIDS.

TOTAL SECTION A : [20]

SECTION B : LIFE AND LIVING

[40]

INSTRUCTIONS

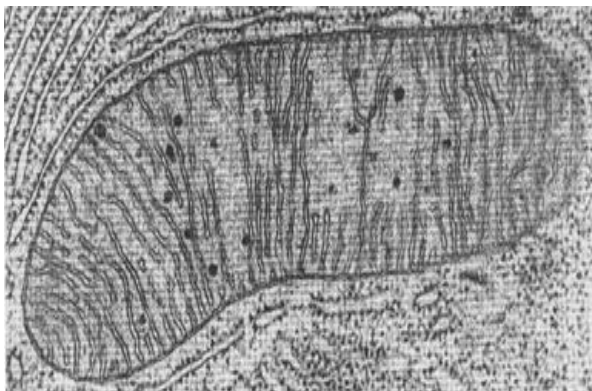
- 1. Leave a line between each sub question for example, between QUESTION 3.1 and QUESTION 3.2.
- 2. Rule off after each QUESTION for example, between QUESTION 3 and QUESTION 4.

QUESTION 3

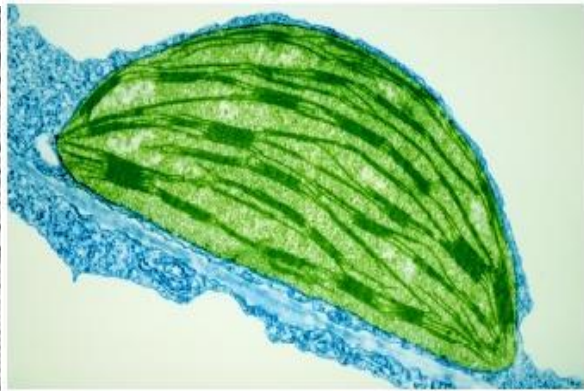
[6]

Study the micrographs of the following organelles.

A



B



- 3.1 Which organelle, A or B, is the mitochondrion?

(1)

3.2 An experiment was conducted to determine the number of mitochondria in cells of different types of human body tissue.

The results of the experiment are recorded in the table below.

TYPE OF TISSUE	NUMBER OF MITOCHONDRIA IN EACH CELL
bone	4
blood	7
fat	2
muscle	14

3.2.1 Name the dependent variable in this experiment. (1)

3.2.2 Which cells in the experiment contain the most mitochondria? (1)

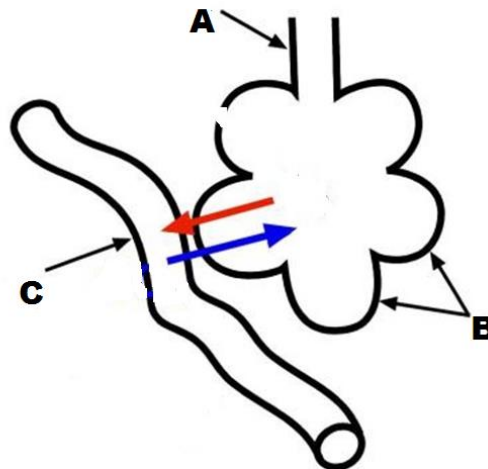
3.2.3 What cellular process takes place inside a mitochondrion? (1)

3.2.4 Describe briefly what happens during the process in 3.2.3 above. (2)

QUESTION 4

[7]

The diagram below forms part of the respiratory system.



4.1 Inside which organ of the body would you find this structure above? (1)

4.2 Name the process that takes place in this structure. (1)

4.3 Identify the parts labelled:

4.3.1 A (1)

4.3.2 B (1)

4.3.3 C (1)

4.4 Name the gas moving from

4.4.1 B to C (1)

4.4.2 C to B (1)

QUESTION 5

[7]

Read the following paragraph on the human heart. Choose the correct answer from the choice in the brackets. Write down only the question number e.g. 5.1 followed by the answer.

“The heart is a muscular organ located in the (5.1 chest / abdominal) cavity. The human heart is composed of (5.2 four / five) chambers. The upper chambers are called (5.3 ventricles / atria). The right half of the heart is associated with (5.4 oxygenated / deoxygenated) blood which is carried to the lungs by the (5.5 pulmonary artery / pulmonary vein.)

The walls of the (5.6 left ventricle / right ventricle) are thicker because it pumps blood under tremendous pressure to all parts of the body. The membrane that protects and surrounds the heart is the (5.7 pleura / pericardium).”

QUESTION 6

[8]

Study the information in the table and then answer the questions that follow.

APPROXIMATE GESTATION PERIODS OF DIFFERENT MAMMALS

MAMMAL	APPROXIMATE GESTATION PERIOD
zebra	1 year
cat	60 days
elephant	22 months
goat	5 months
rabbit	30 days

6.1 What is the difference in gestation time between the animal with the shortest gestation period and the animal with the longest gestation period? Show your working. (2)

6.2.1 Estimate the gestation period of a horse. (1)

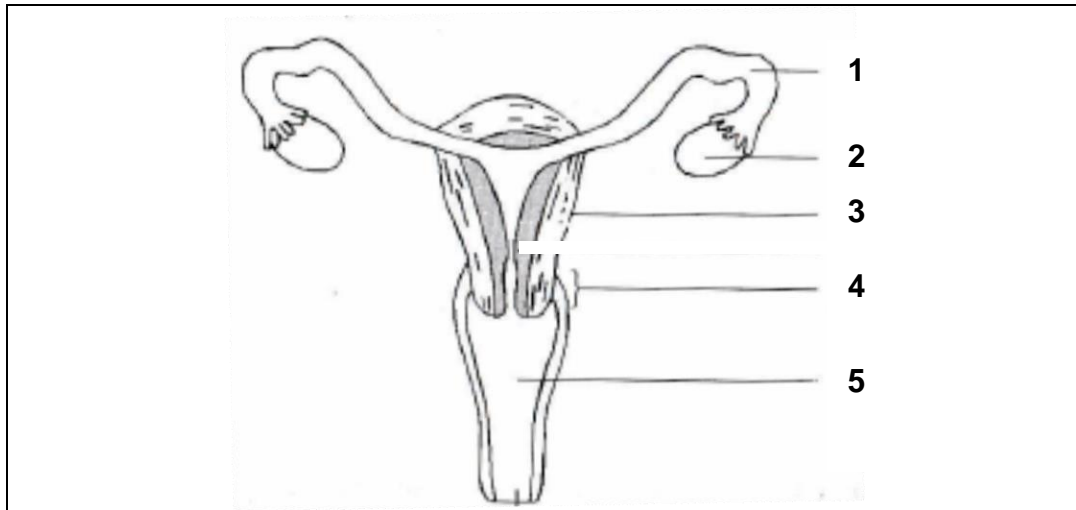
6.2.2 Which animal did you compare the horse to in order to obtain your answer in question 6.2.1? Explain why you chose this animal. (2)

6.3 Would it be fair, do you think, to compare the gestation period of mammals with other animals such as birds? Give a reason for your answer. (2)

6.4 What do you understand by the term 'gestation'. (1)

QUESTION 7

[12]



7.1 Provide labels for the following parts

7.1.1 1 (1)

7.1.2 2 (1)

7.1.3 3 (1)

7.1.4 4 (1)

7.1.5 5 (1)

7.2 Write down only the number 1 - 5 where:

7.2.1 semen is released during intercourse (1)

7.2.2 the placenta develops during pregnancy (1)

7.2.3 ovulation takes place (1)

7.2.4 fertilization of the gametes takes place (1)

7.3 Explain the difference between conception and contraception (2)

7.4 Name one sexually transmitted disease that is cause by a bacterium (1)

TOTAL SECTION B : [40]
TOTAL SECTION A & B : [60]

SECTION C : MATTER AND MATERIALS

[20]

INSTRUCTIONS

1. Start this section at the top of a new page.
2. Leave a line between each sub question for example, between QUESTION 8.1 and QUESTION 8.2.
3. Rule off after each question for example between QUESTION 8 and QUESTION 9.

QUESTION 8 : MULTIPLE CHOICE QUESTIONS

[10]

Four options are provided as possible answers to the following questions.

Each question has only one correct answer.

Write only the letter (A-D) next to the question number (8.1 – 8.10) in the answer book.

8.1 A gas which does NOT form diatomic molecules is....

- A. oxygen
- B. chlorine
- C. hydrogen
- D. carbon dioxide

8.2 The reaction between an acid and a base is called

- A. reduction
- B. neutralization
- C. synthesis
- D. oxidation

8.3 The gas that ignites with a 'pop' or 'squeal' is

- A. oxygen
- B. carbon dioxide
- C. methane
- D. hydrogen

8.4 The correct name for the compound K_2SO_4 is

- A. diphosphorus sulphate
- B. potassium sulphate
- C. potassium sulphur oxide
- D. potassium sulphite

- 8.5 Which equation is **not** balanced?
- A. $2 \text{H}_2 + \text{O}_2 \rightarrow 2 \text{H}_2\text{O}$
 - B. $2 \text{Fe} + \text{O}_2 \rightarrow 2 \text{FeO}$
 - C. $\text{S} + \text{O}_2 \rightarrow \text{SO}_2$
 - D. $\text{Mg} + \text{O}_2 \rightarrow 2 \text{MgO}$
- 8.6 The total number of elements present in **5 CH₃COOH** is
- A. 5
 - B. 6
 - C. 3
 - D. 40
- 8.7 Alkalis have a pH of
- A. 1 – 6
 - B. 7
 - C. 8 – 14
 - D. 1 – 14
- 8.8 Soil with a pH of between 5,5 and 6,5 is said to be ...
- A. salty
 - B. basic
 - C. neutral
 - D. acidic
- 8.9 Which of the following ions are included in the formula Na_3PO_4 ?
- A. Na^{3+} and PO_4^-
 - B. Na^- and PO_4^{3+}
 - B. Na^+ and PO_4^{3-}
 - D. Na^{4+} and PO_4^{4-}
- 8.10 Which of the following is an acid?
- A. NH_3
 - B. NaOH
 - C. Na_2CO_3
 - D. HCl
-

QUESTION 9 : MATCHING COLUMNS**[10]**

Match the statements in column A with the correct words in column B.

Write only the correct letter next to the number in your answer book e.g. (9.1 = C)

COLUMN A		COLUMN B	
9.1	A product of excretion from the kidneys with a pH > 7	A	C
9.2	The flame colour observed when magnesium burns in oxygen	B	O ₂
9.3	Gas exhaled during respiration that turns clear lime water milky	C	NH ₃
9.4	A gas that causes metals to rust	D	White
9.5	The flame colour observed when sulphur burns in oxygen	E	CO ₂
9.6	A solution that is a base	F	Zn
9.7	A compound formed when a metal reacts with oxygen	G	HCl
9.8	A substance found in the stomach that aids digestion	H	NaOH
9.9	Metals are galvanised by coating them in a layer of this metal	I	oxide
9.10	Steel is a mixture of iron and ...	J	blue

TOTAL SECTION C : [20]

SECTION D : MATTER AND MATERIALS

[40]

INSTRUCTIONS

1. Leave a line between each sub question for example between question 10.1 and question 10.2.
2. Rule off after each question for example between question 10 and question 11.

QUESTION 10

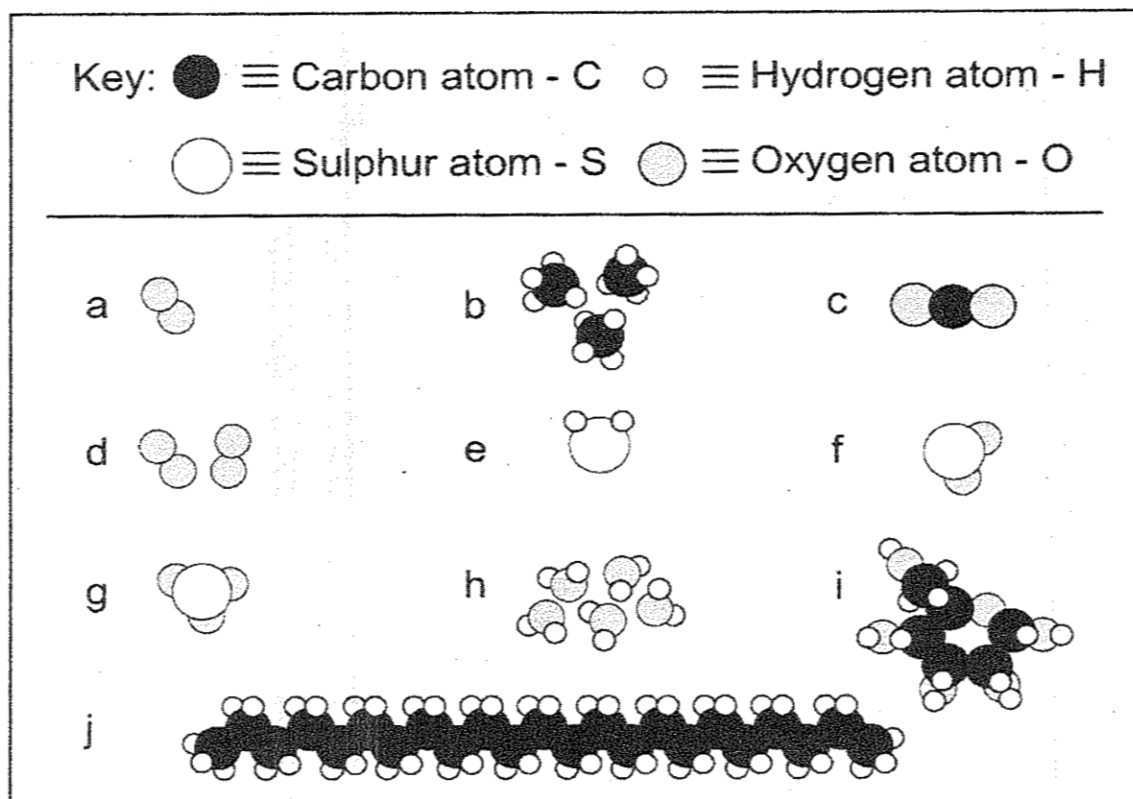
[16]

The following information **on the right** is available for an element.

- | |
|----|
| 13 |
| Al |
| 27 |
- 10.1 What is the name of this element? (1)
- 10.2 In which group on the Periodic Table does this element appear? (1)
- 10.3 In which period on the Periodic Table does this element appear? (1)
- 10.4 Is this element a metal or a non-metal? (1)
- 10.5 Write down the mass number for this element. (1)
- 10.6 How many protons does an atom of this element have in its nucleus? (1)
- 10.7 Draw an energy level / Bohr diagram for an atom of this element (4)
- 10.7.1 How many neutrons does an atom of this element have in its nucleus? (1)
- 10.7.2 Show / explain how you arrived at your answer in 10.7.1 above. (1)
- 10.8 Write down the formula for the product that forms when an atom of this element combines with an atom of:
- 10.8.1 fluorine (2)
- 10.8.2 oxygen (2)
-

QUESTION 11

[8]



11.1 Give the chemical formula for the diagrammatic representations above.

11.1.1 **a** (1)

11.1.2 **d** (1)

11.1.3 **h** (1)

11.1.4 **j** (1)

11.2 Using the key given in the table, represent the following chemical formula using sketches similar to those above:

11.2.1 H_2 (1)

11.2.2 C_2H_6 (1)

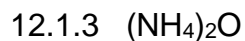
11.3 Give the name of

11.3.1 **b** (1)

11.3.2 **c** (1)

QUESTION 12**[8]**

12.1 Name the following compounds. Use Stock notation where necessary.



12.2 Write formula for the following compounds:

12.2.1 copper (II) chloride

12.2.2 aluminium nitride

12.2.3 calcium oxide

12.2.4 iron (III) carbonate (4)

QUESTION 13**[8]**

13.1 Re-write and balance the following equations:



13.2 Write the following word equation into symbols and then balance the equation.

Nitrogen gas reacts with hydrogen gas to form ammonia. (4)

TOTAL SECTION D : [40]
TOTAL SECTION C & D : [60]
GRAND TOTAL : [120]
