

NORMAN HENSHILWOOD HIGH SCHOOL EXAMINATIONS



Instructions

- Answer ALL the questions.
- Write ALL the answers on the ANSWER PAPER.
- Number the answers correctly according to the numbering system used in this question paper.
- If answers are NOT presented according to the instructions of each question, candidates will lose marks.
- ALL drawings should be done in pencil and labelled in blue or black ink.
- Draw diagrams and flow charts ONLY when requested to do so.
- The diagrams in this question paper may NOT necessarily be drawn to scale.
- The use of graph paper is NOT permitted.
- Non-programmable calculators, protractors and compasses may be used.
- Write neatly and legibly.

DATE	27 May 2011
GRADE	10
SUBJECT	Life Sciences
TIME	2.5 Hours
MARKS	150
EXAMINER	A. Campher
MODERATOR	S. Sirmon and S. Bezuidenhout

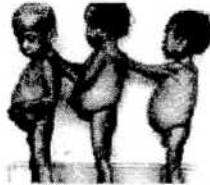

 D. O'Connell
 Principal
 28.5.2011


 S. Sirmon

Section A

- 1.1 Various possible options are provided as answers to the following questions.
Choose the correct answer and write only the letter (A – D) next to the question number (1.1 – 1.10) in the ANSWER BOOK, for example 1.1.6 D.

Questions 1.1.1 and 1.1.2 refer to the diagram below.



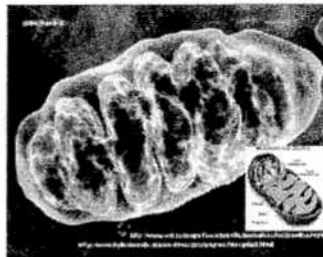
- 1.1.1 The three children show the symptoms of a deficiency in ...
- A) starch
 - B) protein
 - C) vitamin E
 - D) vitamin K
- (1)
- 1.1.2 The disease depicted in the picture is diagnosed as ...
- A) anaemia
 - B) cretinism
 - C) pellagra
 - D) kwashiorkor
- (1)
- 1.1.3 Mitosis ensures that each new cell formed contains:
- A) the same amount of cytoplasm.
 - B) half the number of chromosomes.
 - C) a complete set of chromosomes.
 - D) double the number of chromosomes.
- (1)
- 1.1.4 Which one of the following digestive juices is unable to digest carbohydrates chemically?
- A) saliva
 - B) pancreatic juice
 - C) intestinal juice
 - D) bile
- (1)

1.1.5 A part of a person's large intestine was removed. Which of the following processes will be affected?

- A) The absorption of fats.
- B) The absorption of water.
- C) The absorption of proteins.
- D) The digestion of cellulose.

(1)

Questions 1.6 and 1.7 are based on the following diagram of a cell organelle.



1.1.6 What is this organelle?

- A) a Golgi apparatus
- B) a chloroplast
- C) a mitochondrion
- D) an endoplasmic reticulum (ER)

(1)

1.1.7 This organelle will be found in larger numbers in:

- A) squamous epithelium
- B) bone tissue
- C) cartilage
- D) muscle tissue

(1)

1.1.8 In humans, digestion begins in the ...

- A) stomach
- B) mouth
- C) duodenum
- D) ileum of the small intestine

(1)

- 1.1.9 A pH value of 2 would most likely be found in ...
- A) pancreatic juice
 - B) gastric juice
 - C) saliva
 - D) bile
- (1)

- 1.1.10 Mastication is the process by which food ...
- A) is swallowed.
 - B) moves along the oesophagus.
 - C) is chewed into a fine pulp.
 - D) is ejected as undigested wastes from the body.
- (1)

[10]

1.2 Give the correct biological term for each of the following descriptions. Write only the term next to the question number (2.1 – 2.10) on the ANSWER SHEET.

- 1.2.1 The chemical substance in the stomach which has an antiseptic function. (1)
- 1.2.2 The ejection of solid wastes from the body. (1)
- 1.2.3 The harmful effects on the body of either too much, or too little food. (1)
- 1.2.4 The name given to a solid food ball which passed down the oesophagus by peristalsis. (1)
- 1.2.5 The breakdown of excess amino acids in the liver by the removal of a nitrogen-containing part of the molecules. (1)
- 1.2.6 A psychological state when a person refuses to follow a balanced diet in spite of the availability of sufficient food. (1)
- 1.2.7 A phase of the cell cycle in which chromosome material replicate. (1)

1.2.8 The tissue lining the nasal cavities. (1)

1.2.9 A cancerous growth on/ in one organ. (1)

1.2.10 The valve that closes the opening of the trachea when swallowing. (1)

[10]

1.3 Describe the structure (organelle) and function of each cell part and indicate whether each part is present in plant or animal cells, or in both.

Organelle/ Structure: Cell nucleus, Vacuole, Chromoplasts, Cell wall and Mitochondria

Redraw and complete the table below:

Note the example.

Example:

Structure/ Organelle	Function	Present in plant cells, animals cells, or both.
Cell membrane	It regulates the movement of substances in and out of the cell.	Both

5x2[10]

1.4 By means of a labelled diagram (of a membrane) and short notes explain how substances are **actively transported** into a cell.

- Define process
- Label components of cell membrane and show stages
- Explain how process takes place

[10]

- 1.5 Each of the following questions consists of a statement in the first column and two items [numbers (a) & (b)] in the second column. Consider which item(s) relate(s) to the statement or description. Write your choice next to the relevant question number by using the following codes.

A= if only (a) refers to the statement

B= if only (b) refers to the statement

C= if both (a) and (b) refers to the statement

D= if neither of the items refers to the statement.

	COLUMN A	COLUMN B
1.5.1	Allows an individual not to consume enough food.	a. Poverty
		b. Tradition
1.5.2	Visible bones example knee caps and ribs owing to a lack of food.	a. Kwashiorkor
		b. Marasmus
1.5.3	Consumption of over sized portions of food followed by forced purging.	a. Anorexia nervosa
		b. Bulimia nervosa
1.5.4	Symptoms of a lack of protein in ones diet.	a. Scaly skin
		b. Pot belly
1.5.5	Deliberate refusal of food.	a. Anorexia nervosa
		b. Bulimia nervosa

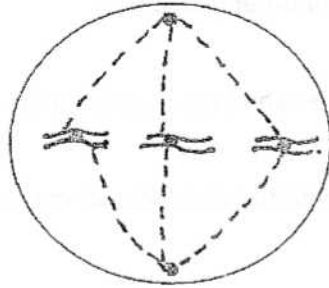
(5 x 2) (10)

[10]

Total Section A: 50 Marks

Section B

2.1 Study the phase of mitosis in the diagram below, and answer the questions that follow.



2.1.1 Identify the phase of mitosis. Give two reasons for your answer. (3)

2.1.2 Indicate the number of:

- chromosomes present. (1)
- chromatids present. (1)
- centromeres present. (1)

2.1.3 Make a labelled drawing of the phase that immediately follows the above phase. (6)

[12]

2.2 Read the following case study and answer the questions which follow:

Growing concern about second-hand smoke

There is growing concern about children being forced to breathe in air that is polluted by second-hand smoke containing toxic or cancer-causing chemicals.

Second-hand smoke, also known as environmental tobacco smoke (ETS), is the smoke exhaled by a smoker from his or her lungs *plus* the smoke from a lit cigarette. Researchers find out about children's ETS inhalation levels in several ways: by using questionnaires and conducting surveys; by analysing air samples for nicotine; and by measuring the levels of cotinine – a biomarker (indicator) of nicotine in blood, saliva or urine samples.

Various studies of the effects of exposure to ETS indicate that even minimal contact can cause respiratory-related illnesses in children of *all* ages. This is because children are smaller so their lungs are smaller and their immune systems are weaker. Children also breathe faster than adults; so in comparison, kilogram for kilogram, children exposed to ETS breathe in more of the harmful chemicals in the same amount of time. This can result in wheezing, asthma, ear infections, respiratory diseases such as croup, bronchitis and pneumonia, lower respiratory tract (lung) illness, and various cancers. Studies of older children link to lower test results for certain subjects such as maths and reading, and an increase in school absence. A specific indication is that smoking during pregnancy is harmful to unborn babies, as is smoking near a child or while breastfeeding.

Suggestions for limiting children's exposure to second-hand smoke:

- Parents should stop smoking; teach children to stay away from second-hand smoke; and avoid smoking areas at restaurants.
- Women should not smoke during pregnancy or while breastfeeding.

- 2.2.1 By what name is second-hand smoke also known? (1)
- 2.2.2 In your own words, explain what second-hand smoke is. (1)
- 2.2.3 Name the biomarker of nicotine that researchers measured the level of. (1)
- 2.2.4 List three negative effects that exposure to second-hand smoke may have on children. (3)
- 2.2.5 Smoking has been linked to most forms of cancer, especially lung cancer and breast cancer. Explain what cancer is and name two ways in which it can be treated. (3)
- 2.2.6 Name another possible cause of cancer aside from smoking. (1)
- 2.2.7 What suggestions does the article give to limit children's exposure to second-hand smoke? (2)

[12]

- 2.3 The following table shows the time it takes the stomach of 100g portions of different foods at certain pH values. In the last column the protein values of the foods are given.

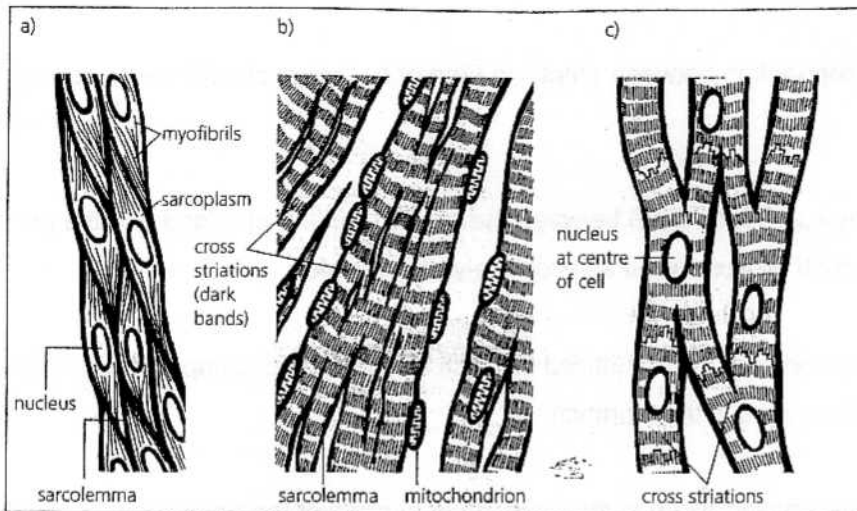
Food (100 g)	Emptying time (minutes)	pH value of gastric juice	proteins (g/100 g)
Milk	130	2,6	3,0
Bread	140	2,5	7,0
Sugar	105	3,0	0,0
Carrot	110	2,9	1,0
Banana	110	2,9	1,0
Chicken	200	2,0	19,0
Beef	185	2,2	16,0
Fish	190	2,1	16,0
Egg	?	?	17,0

- 2.3.1 Which type of food takes the longest to leave the stomach? Explain why. (2)

- 2.3.2 Which type of food takes the shortest to leave the stomach? Explain why. (2)
- 2.3.3 Is there a connection between emptying time of the stomach and the protein content of food? (1)
- 2.3.4 Is there any correlation (link) between the protein content of a food and the pH value of gastric juice? If so, express it as accurately as possible. (2)
- 2.3.5 Explain any connection you noticed in 2.4 in terms of what is happening in the body while food remains in the stomach. (1)
- 2.3.6 Using the information given in the table, draw a graph of the emptying time vs pH value of gastric juice. (8)
- 2.3.7 100g egg is taken in. Estimate: a) How long will it remain in the stomach? (1)
b) What the pH value will more or less be? (1)
- 2.3.8 From your graph determine:
- i.) the emptying time of a food at a pH value of 2.7; (1)
 - ii.) the pH value of gastric juice if the emptying time for a certain food is 150 minutes. (1)

[20]

3.1 Study the diagrams below and answer the questions which follow:



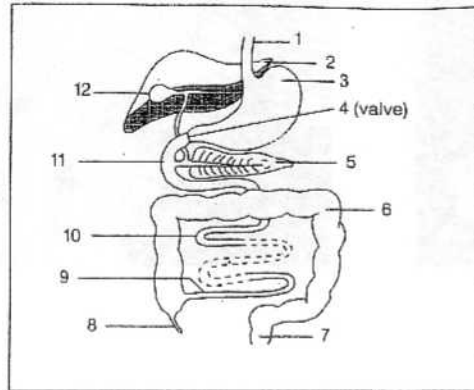
- 3.1.1 To which tissue type do all of the above belong and name its collective function. (2)
- 3.1.2 Name the tissue shown in a, b and c respectively. (3)
- 3.1.3 Which tissue (a or b) is responsible for voluntary movement? What can this tissue also be known as? (2)
- 3.1.4 Give one example of an involuntary movement. (1)
- 3.1.5 The heart has an extremely rich blood supply. It needs a constant supply of food and oxygen to produce enough energy for the heart to beat constantly throughout the life of the animal or human.
- What type of tissue is blood? (2)
 - Which blood cell is responsible for carrying oxygen to the heart and body? (1)
 - What is the scientific name of the above mentioned cell? (1)
- 3.1.6 Name and draw the different types of epithelial tissue found within humans. (4)

[16]

Total Section B: 60 Marks

Section C

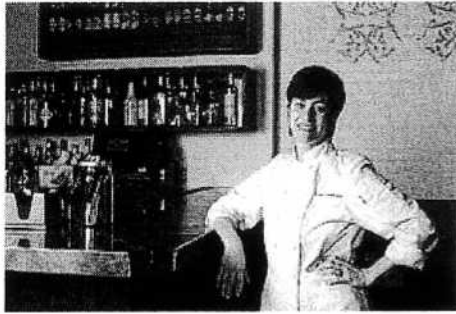
4.1 Study the following diagrams of the alimentary canal and answer the questions that follow.



- 4.1.1 Identify the parts numbered 3, 4, 5, 8 and 12. (6)
- 4.1.2 Name the salivary glands found in the mouth and state where they are situated. (6)
- 4.1.3 Name two functions of the tongue. (2)
- 4.1.4 Write down the number of the structure which is lined by villi.
What is the function of villi? (2)
- 4.1.5 What is an accessory organ? (2)
- 4.1.6 Name two accessory organs. (2)
- 4.1.7 Define the following terms:
- a.) Gastrin (1)
 - b.) Plaque (2)
 - c.) Chyme (2)

[25]

Question 2



2.1 Write an essay explaining the impact religion has on diets worldwide.

- Discuss what a balanced diet is
- Name different religions
- Types of vegetarians
- Discuss unique practises
- What dangers strict dietary rules (limitations) pose to one's health

(12+3=15)

[15]

Total Section C: 40 Marks

TOTAL 150 MARKS