NAME: _________________________________       CLASS: _______________________________

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TOTAL MARK

85% Theory Paper | 15% Practical | 100% Final Score

85%               |                | 15%               | 100% Final Score
Section A

Answer ALL questions in this section.

1. Vegans exclude eggs and dairy products such as animal milk, cheese, butter and yoghurt from their diet. Plant milk such as soy milk or almond milk is used in vegan diets. Soy milk is complete in protein, containing all the essential amino acids. Most vegan diets contain little or no vitamin D however they contain as much iron as animal-based diets.

a. From the passage above write the food substance that is:
   i. needed for growth and repair of worn-out or damaged tissues
   ii. necessary to prevent rickets
   iii. lacking in anaemic patients.

   (1, 1, 1 mark)

b. Write the term that describes a diet that contains all the food substances in the right proportions.

   _______________________________________________________________________

   (1 mark)

c. A school launched the following “Cut the junk” poster in a Healthy Eating campaign among teenagers.

   Discuss the biological message in the poster.

   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________

   (2 marks)

d. Mediterranean diets are rich in unrefined cereals, legumes, fruits and vegetables. Explain the benefits of this type of diet.

   _______________________________________________________________________

   (2 marks)

Total: 8 marks
2. The following diagram shows the breathing rate of a young person participating in a 400 metre race.

![Breathing Rate Graph]

a. Explain the increase in breathing rate in part A of the graph.

____________________________________________________________________________
____________________________________________________________________________

(2 marks)

b. From the graph write the letter that represents the time when:

i. lactic acid is produced _______

ii. the oxygen debt is paid off. _______

(1 mark)

c. Compare the action of the intercostal muscles during breathing in and breathing out.

____________________________________________________________________________
____________________________________________________________________________

(1 mark)

d. Name the gas whose concentration in the blood increases during breathing in.

____________________________________________________________________________

(1 mark)

e. During exercise the heart pumps more blood each minute. Explain TWO ways how this is achieved.

____________________________________________________________________________
____________________________________________________________________________

(2 marks)

Total: 8 marks
3. In patients that suffer from Transposition of the Great Arteries, the pulmonary artery and the aorta are reversed. This implies that the pulmonary artery leaves the left ventricle and the aorta leaves the right ventricle.

a. Describe the flow of oxygen-poor blood and oxygen-rich blood in patients suffering from Transposition of the Great Arteries:
   i. oxygen-poor blood _________________________________________________________
   ii. oxygen-rich blood _______________________________________________________

   (1, 1 mark)

b. Aortic valve stenosis (AS) is a heart disease in which the opening of the aortic valve is narrowed. The aortic valve is the semilunar valve between the left ventricle of the heart and the aorta.
   i. Name the valve between the left atrium and the left ventricle.

   ii. Explain how the AS disease affects the heart beat and the left ventricle muscle wall.

   (1, 2 marks)

c. A newborn baby was suffering from the heart condition tricuspid atresia – where there is complete absence of the tricuspid valve.
   i. Explain why a newborn with this condition is often short of breath.

   ii. Explain the exact location of the tricuspid valve.

   (1, 1 mark)

d. The heart muscle has a large number of mitochondria and a good supply of blood. Explain.

   (3 marks)

Total: 10 marks

4a. Distinguish between:
   i. where urea is produced and where it is excreted

   (3 marks)

Total: 10 marks
ii. where bile is produced and where it is stored

__________________________

__________________________

(2, 2, 2 marks)

b. Name TWO substances that are NOT present in urine of healthy individuals.

__________________________

__________________________

(2 marks)

c. Jerboas are desert rats. Describe the urine and faeces of jerboas.

__________________________

(2 marks)

Total: 10 marks

5. Lactose is a disaccharide present in dairy products. To be absorbed, the lactose needs to be broken down into its two component sugars. This digestion is brought about by specific enzymes that lie in the microvilli of the lining of the small intestine. A deficiency of this enzyme leads to an inability to break down lactose. As a consequence, patients suffering from lactose intolerance suffer from diarrhoea due to fluid entering the small intestine.

a. Name the disaccharide present in fruit.

__________________________

(1 mark)

b. Name the component sugars (monosaccharides) present in lactose.

__________________________

(2 marks)

c. The hormone secretin secretes the alkali bicarbonate into the small intestine. Explain the biological importance of the secretion of bicarbonate in the small intestine.

__________________________

(1 mark)

d. Enzymes are not altered by the reaction in which they take part. Explain the biological importance of this.

__________________________

(1 mark)

e. From the passage above choose and write the phrase that indicates that each enzyme controls one type of reaction.

__________________________

(1 mark)

f. Digestion starts in the mouth. Describe ONE mechanical digestion process and ONE chemical digestion process taking place in the mouth.

Mechanical digestion:

__________________________

Chemical Digestion:

__________________________

(1, 1 mark)
g. Explain the role of microvilli in the lining of the small intestine. 

(2 marks)

Total: 10 marks

6. The following apparatus was set up in the lab. The experiment was exposed to light for about six hours. Concentrated NaOH solution was placed in Jar A. Sodium hydroxide (NaOH) absorbs carbon dioxide present in air.

a. After six hours a leaf from the plant in each jar was tested for starch. Describe the result you would expect.

Leaf from Jar A: ____________________________________________________________

Leaf from Jar B: ____________________________________________________________

(2 marks)

b. List ONE variable that needs to be kept the same during the experiment.

________________________________________________________ (1 mark)

c. A biology teacher conducted an experiment to investigate the products of photosynthesis. First a lighted candle was placed in a sealed chamber. After a short while the candle goes out. A sprig of mint is then introduced into the chamber without any air being let in. The apparatus is left in the light. After ten days the candle, on being lit, burns again. The following diagram shows the experiment set up.
Name the gas released by photosynthesis that allows the candle to burn again.
_________________________________________________ (1 mark)

d. A biology student placed a white carnation in a beaker with methylene blue stain dissolved in water. After six hours the carnation turned into a light blue. Explain the result obtained.
_________________________________________________ (2 marks)
e. The photosynthetic cells are mainly on the upper side of the leaf. Explain.
_________________________________________________ (3 marks)

Total: 9 marks

Section B

Answer any THREE questions from this section. Answer all questions of Section B on a foolscap.

1. Asthma is a respiratory disease where the bronchial airways are extra sensitive. The airways become inflamed and produce excess mucus. The muscles around the airways tighten, thus making the airways narrower.

   a. Describe the position of the lungs in the human body. (2 marks)

   b. Give the correct term for each the following:

      i. the airway that leads from the mouth to the bronchi

      ii. the sacs found at the end of bronchi. (1, 1 mark)

   c. Explain the role of mucus in the human respiratory system. (2 marks)

   d. Exposure to cigarette smoke may bring about an asthma attack.

      i. Describe the effect of tar in cigarette smoke on the cilia found at the airways.

      ii. A smoker is 20 times more likely to develop bronchitis than a non-smoker. Explain. (2, 3 marks)

   e. The ribcage and diaphragm are involved in breathing.

      i. Name the type of tissue that forms the diaphragm.

      ii. Explain the movement of the ribcage and diaphragm during breathing in. (1, 2 marks)

   f. Name the gas that is excreted by the lungs. (1 mark)

Total: 15 marks
2a. Give a biological explanation for each the following statements:
   i. Herbivores have a longer small intestine than carnivores.
   ii. Few plants grow under the canopy of large trees.
   iii. Digestion of carbohydrates occurs in the mouth and small intestine

b. Explain why each of the following statements is incorrect:
   i. Products of anaerobic respiration in muscle cells are lactic acid and carbon dioxide.
   ii. All cells of the leaf contain chloroplasts.
   iii. All organisms require specialised gas exchange organs.

3. A biologist described some of the interactions between organisms in a forest.

   The Gray squirrel and the White-tailed deer feed on rice grass. Bald eagles feed on the Gray squirrel while wolves hunt and feed on the White-tailed deer and the Gray squirrel.

   a. Draw a food web to illustrate the interactions described in the passage above. (5 marks)
   b. From the passage above name ONE:
      i. producer
      ii. carnivore. (1, 1 mark)
   c. A lot of energy is lost along a food chain. Name ONE way by which energy is lost from one level to the next. (2 marks)
   d. The Gray squirrel population was drastically affected by a viral disease. Discuss how this affects the population of White tailed deer. (2 marks)
   e. White-tailed deer have a rumen. Explain the presence of bacteria in the rumen. (2 marks)
   f. Wolves have long and pointed canines. Explain. (2 marks)

4. Distinguish between each of the following:
   a. breathing in insects and in fish (4 marks)
   b. haemoglobin and oxyhaemoglobin (3 marks)
   c. phloem vessels and xylem vessels (4 marks)
   d. duodenum and ileum. (4 marks)

Total: 15 marks
5. Give a biological explanation for each of the following posters.

a. Biogas racing car.
   Powered by your waste!

   (3 marks)

b. Emphy
   No

   (3 marks)

c. A lemon a day keeps the scurvy away!

   (2 marks)
d. I switched to biological detergents!

(3 marks)

e. (4 marks)

Total: 15 marks