

Trial Examination 2011

VCE Biology Unit 1

Written Examination

Question and Answer Booklet

Reading time 15 minutes
Writing time 1 hour 30 minutes

Student's Name: _____

Teacher's Name: _____

Structure of Booklet

Section	Number of questions	Number of questions to be answered	Number of marks
A	25	25	25
B	7	7	50
			Total 75

Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners and rulers.

Students are NOT permitted to bring into the examination room: blank sheets of paper and/or white out liquid/tape.

No calculator is allowed in this examination.

Materials supplied

Question and answer booklet of 17 pages.

Answer sheet for multiple-choice questions.

Instructions

Please ensure that you write your **name** and your **teacher's name** in the space provided on the answer sheet for multiple-choice questions.

All written responses must be in English.

At the end of the examination

Place the answer sheet for multiple-choice questions inside the front cover of this booklet and hand them in.

Students are NOT permitted to bring mobile phones and/or any other electronic communication devices into the examination room.

SECTION A: MULTIPLE-CHOICE QUESTIONS**Instructions for Section A**

Answer **all** questions in pencil on the answer sheet provided for multiple-choice questions.

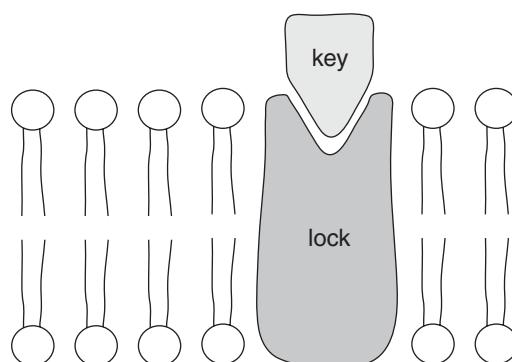
Choose the response that is **correct** for the question.

A correct answer scores 1, an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No marks will be given if more than one answer is completed for any question.

The following information relates to Questions 1 to 4.



The diagram above is of a plasma membrane. The 'key' is either an agonist or an antagonist. The 'lock' acts as a receptor. An agonist binds to the receptor to activate a particular response. An antagonist blocks receptors preventing them from being activated.

Question 1

The chemical composition of the lock in the above diagram is

- A. lipid.
- B. carbohydrate.
- C. protein.
- D. cholesterol.

Question 2

An inhaler, a 'key', is used to treat asthma by dilating the airways.

This would act on the

- A. trachea.
- B. oesophagus.
- C. alveoli.
- D. bronchi.

Question 3

An example of an antagonist is

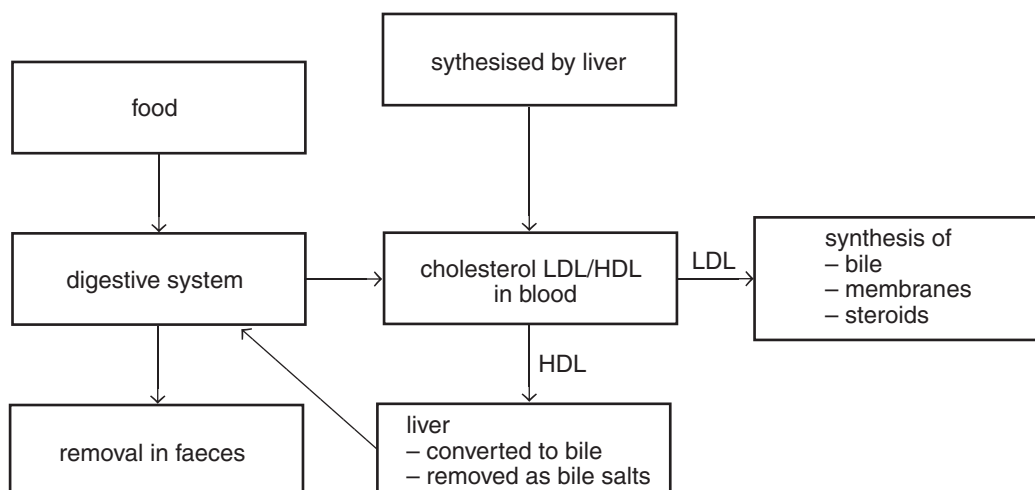
- A. a substrate in an enzymic reaction.
- B. a beta blocker which stops the heart being sped up.
- C. glucose entering a cell.
- D. an inhaler dilating the airways.

Question 4

The movement of molecules between pores in the phospholipid bilayer occurs by

- A. diffusion.
- B. active transport.
- C. exocytosis.
- D. pinocytosis.

The following information relates to Questions 5 and 6.



The diagram above shows the cholesterol pathway/transport in the body.

Question 5

The food which would contain relatively large amounts of cholesterol is

- A. fruit.
- B. vegetables.
- C. meat.
- D. cereal.

Question 6

It is reasonable to conclude that cholesterol

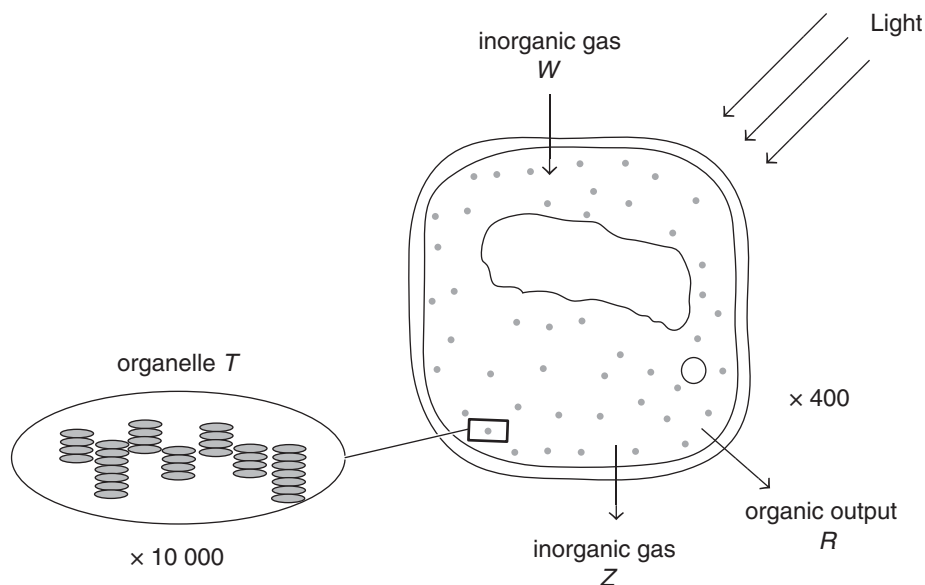
- A. does not assist digestion.
- B. only comes from dietary sources.
- C. is removed naturally from the body.
- D. in HDL form is necessary for the synthesis of steroids, e.g. testosterone.

Question 7

In a plant cell, the molecule with the highest amount of energy available is

- A. starch.
- B. sucrose.
- C. glucose.
- D. ATP.

The following information relates to Questions 8 and 9.



The diagram above is of a typical plant cell as viewed under a light microscope. The arrows indicate the inputs and outputs of the cell.

Question 8

Organelle *T*, abundant in the above cell is

- A. a mitochondrion.
- B. chlorophyll.
- C. a chloroplast.
- D. a ribosome.

Question 9

The molecules representing *W*, *Z* and *R* respectively are

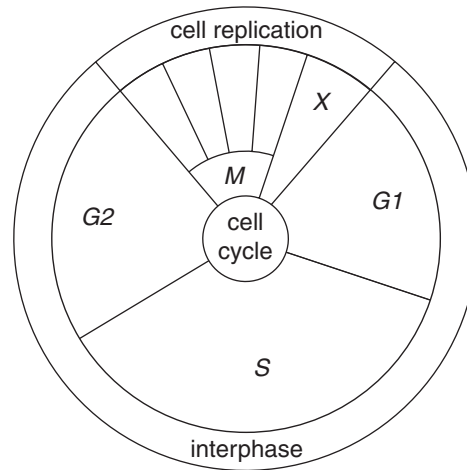
- A. oxygen; carbon dioxide; glycogen.
- B. carbon dioxide; oxygen; glucose.
- C. oxygen; carbon dioxide; starch.
- D. carbon dioxide; oxygen; glycogen.

Question 10

Mitosis would occur in a human adult's

- A. skin.
- B. brain.
- C. red blood cell.
- D. testes.

The following information relates to Questions 11 and 12.



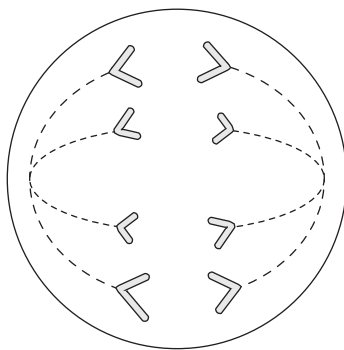
The diagram above is of the cell cycle.

Question 11

Stage *X* represents

- A. meiosis.
- B. DNA replication.
- C. apoptosis.
- D. cytokinesis.

The following information relates to Question 12.

**Question 12**

The diagram above represents a cell at stage

- A. *G1*.
- B. *S*.
- C. *M*.
- D. *X*.

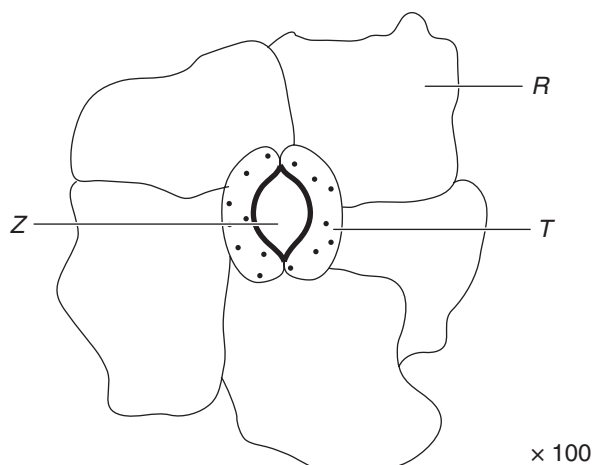
Question 13

An organic compound was chemically analysed and apart from having carbon, hydrogen and oxygen, it also contained large amounts of nitrogen and phosphorus.

The organic compound would best be classed as

- A. a phospholipid.
- B. an amino acid.
- C. a carbohydrate.
- D. a nucleic acid.

The following information relates to Questions 14 to 16.



The diagram above shows the lower epidermis of a typical leaf from a temperate environment.

Question 14

When considering Z it would be expected that

- A. light would enter here.
- B. the opening would be determined by environmental factors such as water.
- C. oxygen would be released at night.
- D. changes in opening would influence cellular respiration but not photosynthesis.

Question 15

When comparing cells R and T, it would be expected that Cell R would

- A. allow more light to pass through.
- B. be the primary site of photosynthesis.
- C. have a similar structure to human epidermal cells.
- D. regulate water loss.

Question 16

Water which enters the roots and exits through the leaves would

- A. be carried by translocation to the leaves.
- B. travel through the xylem from the roots.
- C. travel through the phloem from the roots.
- D. be used in photosynthesis.

Question 17

In the mammalian circulatory system, you would **not** expect to find valves

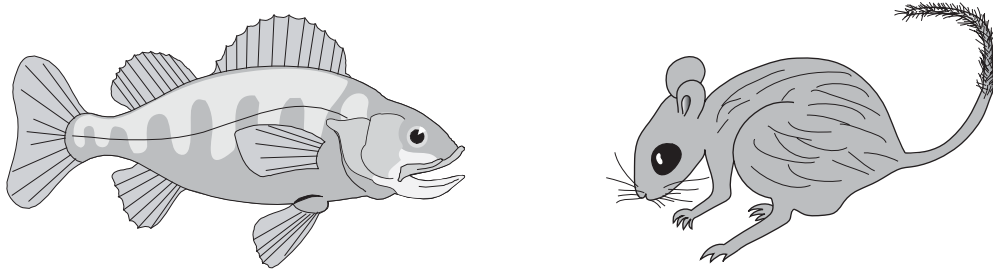
- A. at the start of some arteries.
- B. in capillaries.
- C. between the atria and ventricles.
- D. in veins.

Question 18

The highest level of oxygen in the following structures of the mammalian circulatory system would be in the

- A. right atrium.
- B. pulmonary vein.
- C. pulmonary artery.
- D. vena cavae.

The following information relates to Questions 19 to 21.



The diagram above shows a fish and a desert dwelling mammal.

Question 19

When the volume and concentration of urine is compared between the fish and the mammal, it would be reasonable to expect that the fish would produce

- A. large amounts of dilute urine.
- B. small amounts of concentrated urine.
- C. large amounts of concentrated urine.
- D. small amounts of dilute urine.

Question 20

The main nitrogenous waste produced by the mammal would be

- A. urea.
- B. uric acid.
- C. ammonia.
- D. amino acids.

Question 21

Nitrogenous wastes are produced from the breakdown of

- A. carbohydrates.
- B. lipids.
- C. amino acids.
- D. minerals.

Question 22

Cilia, fine hair-like structures can trap debris and beat rhythmically to remove it.

They would be found in the mammalian respiratory system in the

- A. nose.
- B. trachea.
- C. bronchioles.
- D. alveoli.

Question 23

The diffusion gradient, that maintains gas exchange in the lungs, is possible due to the alveoli having

- A. blood that passes by.
- B. a large surface area.
- C. thin walls.
- D. a moist surface.

Question 24

Oxygen is primarily carried by

- A. plasma.
- B. platelets.
- C. red blood cells.
- D. white blood cells.

Question 25

Budding in yeast, and spores being produced in a fungus, such as a mushroom, are both examples of

- A. sexual reproduction and involve meiosis.
- B. asexual reproduction and involve mitosis.
- C. sexual reproduction and involve mitosis.
- D. asexual reproduction and involve meiosis.

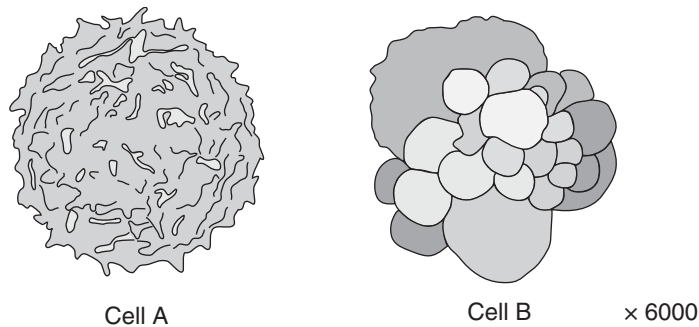
SECTION B: SHORT-ANSWER QUESTIONS**Instructions for Section B**

Answer this section in **pen**.

Answer all questions in the spaces provided.

Question 1

In the following diagram, Cell A represents a white blood cell and Cell B represents the cell undergoing programmed cell death.



- a. Describe why a cell may undergo programmed cell death.

1 mark

- b. i. What is a function of white blood cells in the mammalian circulatory system?

1 mark

- ii. State one way that red blood cells differ structurally from white blood cells.

1 mark

- c. The diagrams above are derived from information produced by a scanning electron microscope (SEM).

- i. Give one advantage of using an SEM over a light microscope.

1 mark

- ii. Give two advantages gained from using a light microscope compared to an SEM.

2 marks

Total 6 marks

Question 2

Skeletal muscle fibres are of two types. Type 1 is a slow form, taking longer to shorten compared to type 2 which can contract up to four times faster and hence shorten faster. Research has found that successful marathon runners have a much higher proportion of type 1 fibres and elite athletes such as sprinters, jumpers and throwers have a greater proportion of type 2 fibres. These athletes, however, are more prone to rapidly fatiguing.

- a. i. Which muscle type, 1 or 2, is most likely to respire predominantly aerobically?

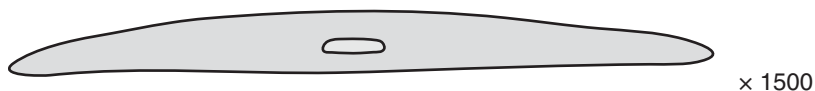
1 mark

- ii. Write out the word equation for this reaction.

2 marks

- b. Name the product of cellular respiration which contributes to muscle fatigue.

1 mark



The diagram above is of a skeletal muscle cell.

- c. Name three features that a skeletal muscle cell has in common with a typical plant cell.

3 marks

- d. Name an organelle which would be abundant in a muscle cell but not in another, e.g. a skin cell.

1 mark

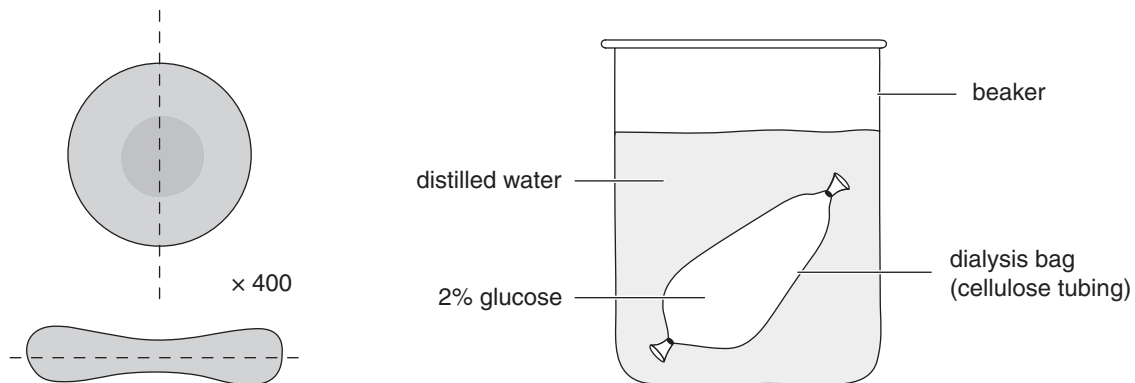
- e. Give a feature which would be used to distinguish this cell from a typical prokaryotic cell and explain how it would differ.

2 marks

Total 10 marks

Question 3

The diagram below shows the cross-section of a red blood cell and a dialysis bag in a beaker.



Substances can move through membranes by different processes such as diffusion, active transport, osmosis, exocytosis and facilitated diffusion.

- a. Which of these processes would only occur through the cell membrane of a living cell and not the dialysis tubing bag? Explain your answer.

3 marks

- b. After 20 minutes the dialysis bag had swollen and was turgid.

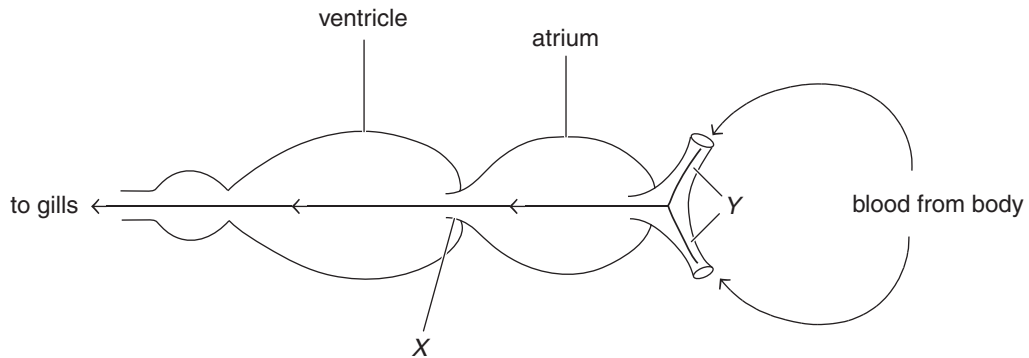
- i. Which of the above processes had occurred?

1 mark

- ii. Define this process.

2 marks

Total 6 marks

Question 4

The diagram above shows blood flowing through the heart of a fish.

- a.** Name structure *X* and give its function.

2 marks

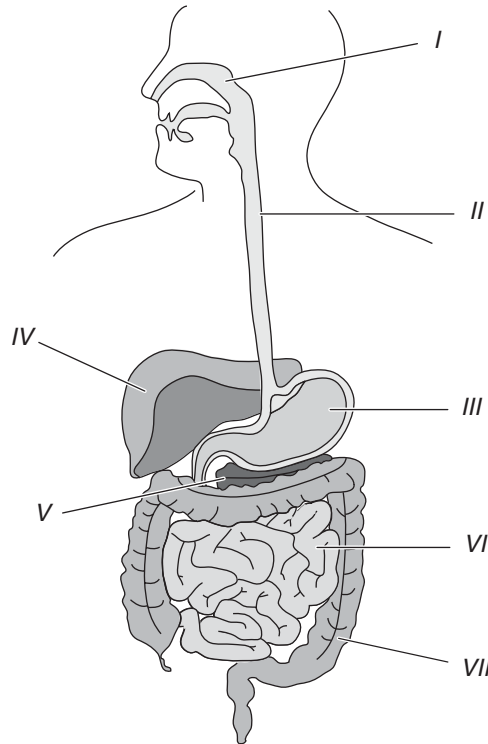
- b.** Which would have the thicker wall, the atrium or the ventricle? Explain your answer.

2 marks

- c.** Give the name of the type of blood vessel of *Y*.

1 mark

Total 5 marks

Question 5

The diagram above is of a mammalian digestive system.

- a. In which organs, *I* to *VII*, would digestive enzymes be produced?

2 marks

- b. i. What is the general role of an enzyme?

1 mark

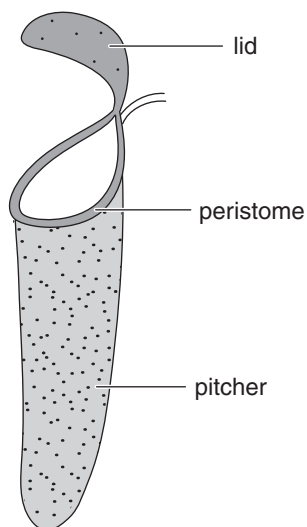
- ii. Explain why an enzyme produced in one part of the digestive system does not function in another part.

1 mark

- c. Name organ *IV* and *VII* and give a function of each.

4 marks

Total 8 marks

Question 6

The diagram above is of a pitcher plant. Pitcher plants have modified leaves which attract, trap and digest animals, varying in size from insects and small reptiles to mammals such as rats.

- a.** Describe two ways animals could be attracted to the pitcher.

2 marks

- b.** Give a suitable function for the lid with respect to digestion.

1 mark

- c.** Digestion is much faster in a human than in the pitcher plant. Outline two reasons for this.

2 marks

Total 5 marks

Question 7

The table below lists scientific and common names.

Scientific name	Common name
<i>Felis domesticus</i>	house cat
<i>Canis lupus</i>	wolf
<i>Dasyures viverrinus</i>	native cat
<i>Canis familiaris</i>	dog
<i>Felis viverrinus</i>	fishing cat

- a. How many different genera are indicated above?

_____ 1 mark

- b. Name a pair of animals from the table that are closely related. Explain your answer.

_____ 2 marks

- c. Would the animals above be expected to be in the same class and phylum? Explain your answer.

_____ 2 marks

- d. Why is it important to use scientific names to describe an organism rather than common names?

_____ 2 marks

Total 7 marks

Question 8

Scientific method is based on experiments. To produce valid results a controlled experiment should be undertaken to produce valid and repeatable results. Experiments should be based on a hypothesis.

- a.** Define hypothesis.

_____ 1 mark

- b.** Outline the main components of a controlled experiment.

2 marks
Total 3 marks

END OF QUESTION AND ANSWER BOOKLET