

SECONDARY SCHOOL ANNUAL EXAMINATIONS 2010

Directorate for Quality and Standards in Education
Educational Assessment Unit

BIOLOGY – FORM V
TIME: 1H 45 MIN

NAME: _____ CLASS: _____

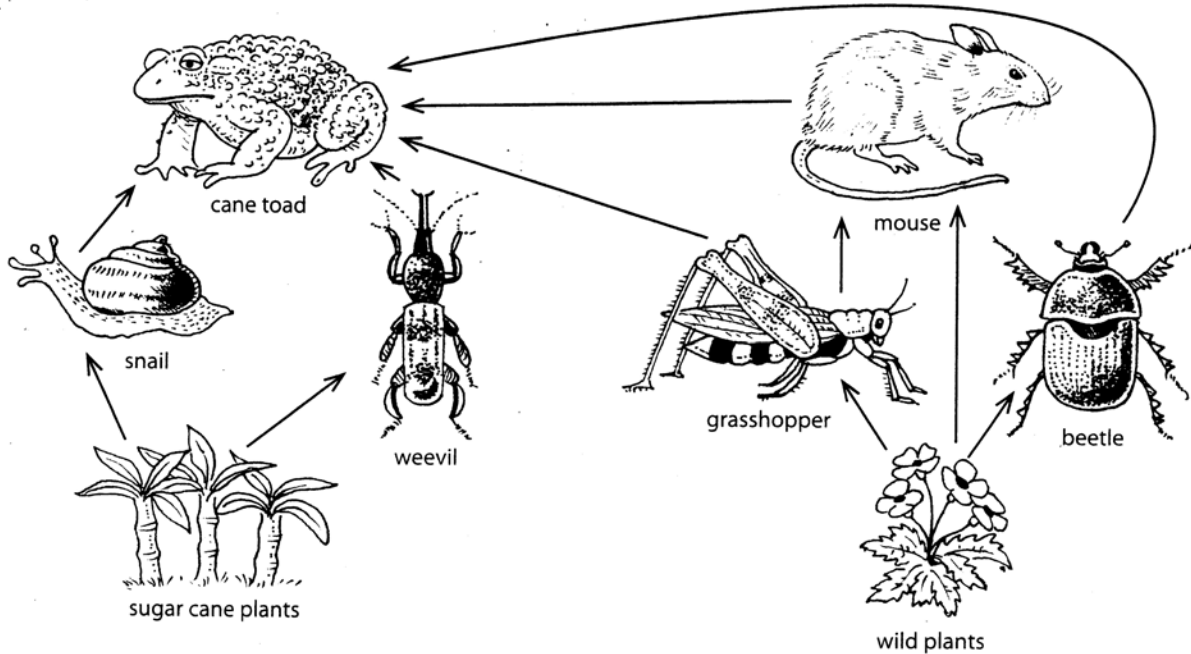
Question No.	Section A							Section B					
	1	2	3	4	5	6	7	1	2	3	4	5	
Max mark	7	8	9	8	5	9	9	15	15	15	15	15	
Actual mark													TOTAL MARK

85% Theory Paper	15% Practical	100% Final Score

Section A

Answer all questions in this Section.

1. Farmers in Australia grow sugar cane plants as a crop. The following diagram shows a food web that farmers in Australia are using to decide whether to use the cane toad as a biological pest control method. The cane toad is not native to Australia.



- a. List ONE reason why a farmer prefers a biological pest control method than the use of chemical pesticides.
_____ (1 mark)
- b. From the food web name:
(i) ONE pest

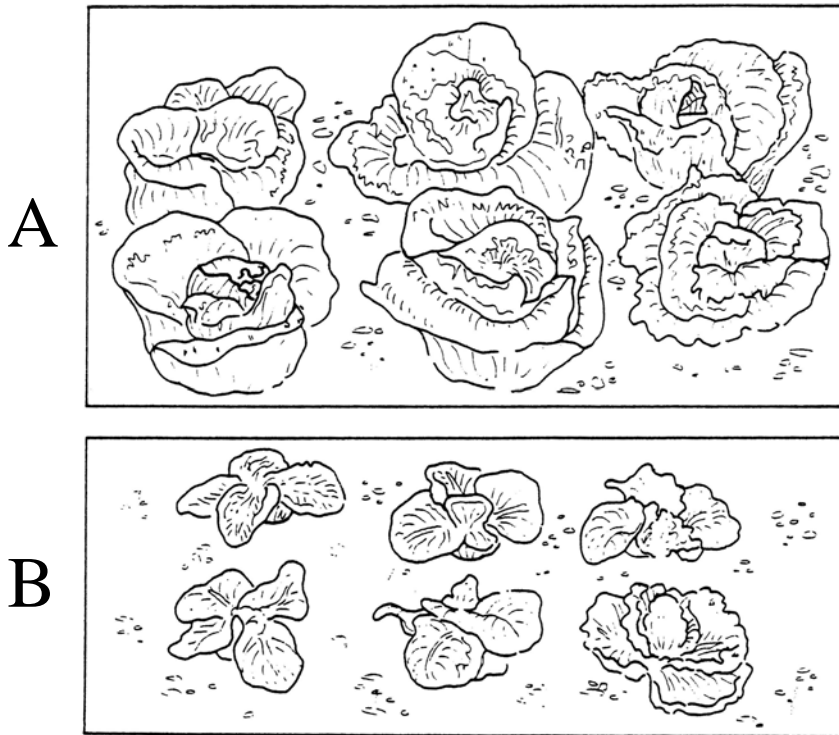
(ii) ONE secondary consumer

(iii) the THREE organisms that belong to the same phylum.
_____ (1, 1, 1 mark)
- c. Use the food web above to write a food chain that includes four trophic levels.
_____ (1 mark)
- d. Explain how **each** of the following characteristics helps to increase the population of cane toads.
(i) The cane toads themselves are highly poisonous.

(ii) The tadpoles of cane toads develop faster than those of native toad species.

(1, 1 mark)
Total 7 marks

2. The following diagram shows two batches (A and B) of lettuce planted at the same time in an experiment to investigate the effect of carbon dioxide on plant growth.



- a. Which batch was supplied with extra carbon dioxide? Give a reason for your answer.

_____ (3 marks)

- b. Light intensity was kept constant throughout the investigation.

- (i) List TWO other environmental conditions that need to be kept constant during the investigation.

- (ii) If you are asked to manage a greenhouse what change would you carry out to the light intensity in the greenhouse?

_____ (2, 1 mark)

- c. The warm, humid conditions and abundant food in a greenhouse provide an excellent stable environment for pest development. A pest reduces the yield of crop plants. List TWO ways in which a pest can reduce the yield of crop plants.

_____ (2 marks)

Total 8 marks

3. The liver receives all the molecules that the gut absorbs from food. As well as useful molecules such as glucose and amino acids, this may include harmful molecules such as drugs or poisons. Alcohol is a drug that passes quickly to the liver after being absorbed from the stomach and ileum.

a. Name the TWO blood vessels that carry blood to the liver.

_____ (2 marks)

b. From the passage above name the organ with an acidic pH.

_____ (1 mark)

c. The liver is considered as a storage organ. Explain.

_____ (2 marks)

d. Alcohol causes small blood vessels in the skin to dilate. What is the visible effect of this?

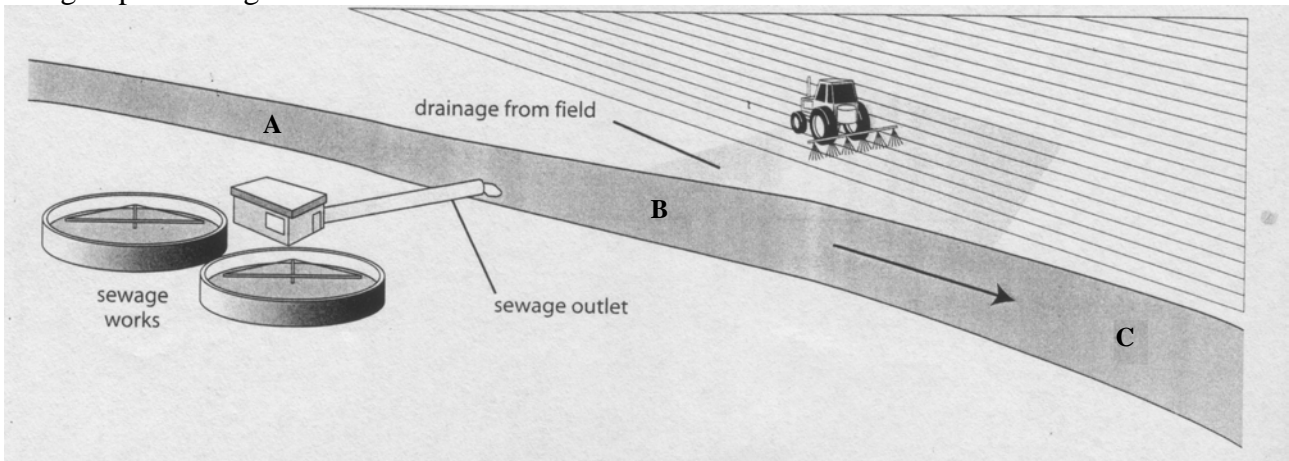
_____ (1 mark)

e. Wilson's disease is an autosomal recessive genetic disorder in which copper accumulates in tissue. The Wilson's disease gene (ATP7B) has been mapped to chromosome 13 and is expressed primarily in the liver. Use genetic diagrams to explain why two unaffected parents were surprised to know that their first-born child was suffering from Wilson's disease. (Use the letter **D** to represent Normal and the letter **d** to represent Wilson's Disease)

(3 marks)

Total 9 marks

4. The following diagram shows parts of a river (A, B and C) that are being investigated by a group of biologists.



- a. At which point along the river would you expect the biologists to find the lowest concentration of dissolved oxygen in the water? Give a reason for your answer.
- _____ (2 marks)
- b. The farmer of the field next to the river prefers using biodegradable pesticides instead of persistent pesticides. List ONE advantage of this.
- _____ (1 mark)
- c. At which point along the river would the biologists find the largest population of fish? Give a reason for your answer.
- _____ (2 marks)
- d. The sludge worm and the bloodworm are found in polluted waters. Name the phylum to which both worms belong.

sludgeworm



bloodworm



- _____ (1 mark)
- e. The farmer is planning to build a big farmhouse on the site of the field. List TWO negative effects of this project.
- _____ (2 marks)

Total 8 marks

5. A biology student used some seeds for an investigation about the effect of light on germination seeds.

The following diagram shows the containers with seeds that the student has set up.

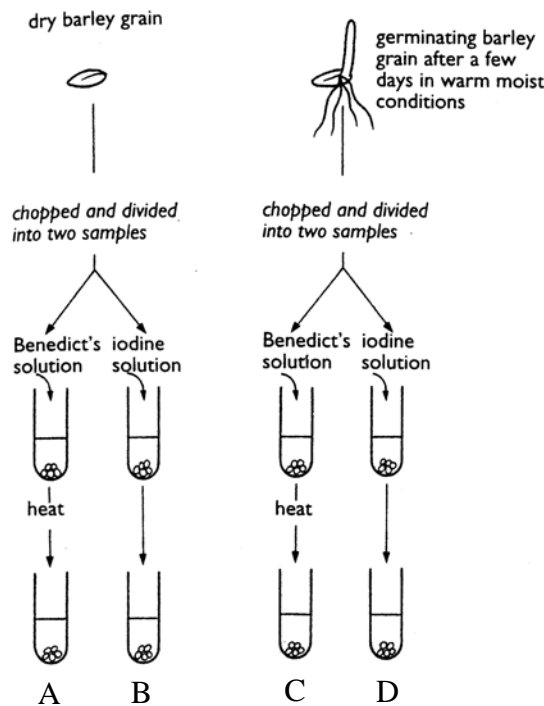


- a. From the diagram above list:
 (i) TWO factors that make this a fair investigation

- (ii) ONE factor that needs to be changed to make the investigation more valid.

(2, 1 mark)

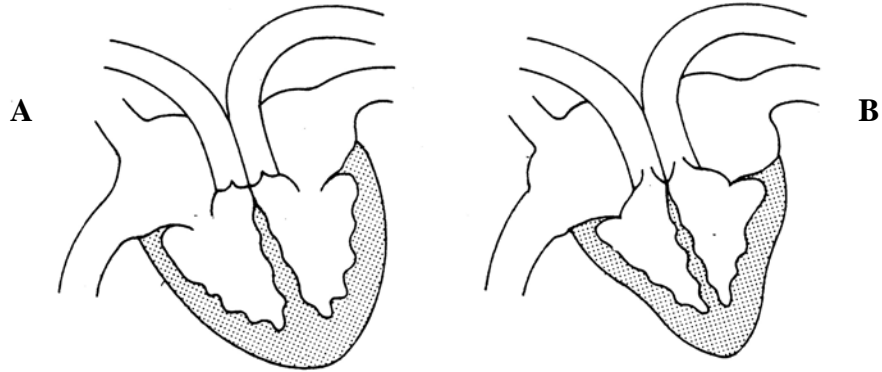
- b. The student carried out further investigations about the effect of germination on barley grains.
 The following diagram shows the experimental set-up.



Explain why there was no change in test-tube A while an orange precipitate was formed in test-tube C.

(2 marks)
Total 5 marks

6. The following diagrams (A and B) show two different stages in the cardiac cycle.



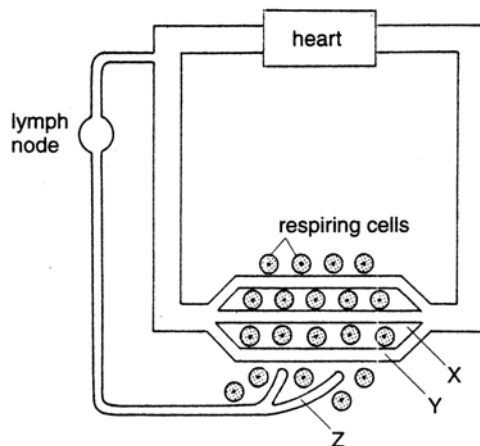
a. List TWO differences between the two diagrams A and B.

(4 marks)

b. On average the length of one cardiac cycle is 0.8 seconds. How many beats in 1 minute?

(1 mark)

c. The following diagram shows a simplified version of the human circulatory system.



Which letter in the diagram indicates:

- (i) blood plasma _____
- (ii) lymph _____
- (iii) tissue fluid? _____

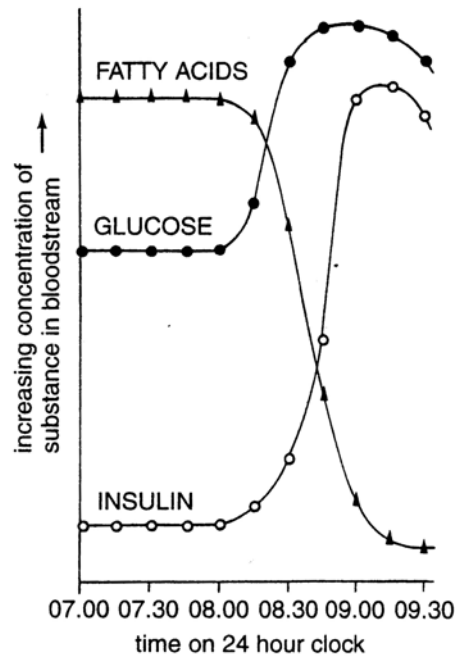
(1, 1, 1 mark)

d. State ONE difference between blood plasma and tissue fluid.

(1 mark)

Total 9 marks

7. The following diagram shows the effect of consuming 50g of glucose (after a period of fasting) on the concentration of fatty acids, glucose and insulin in bloodstream.



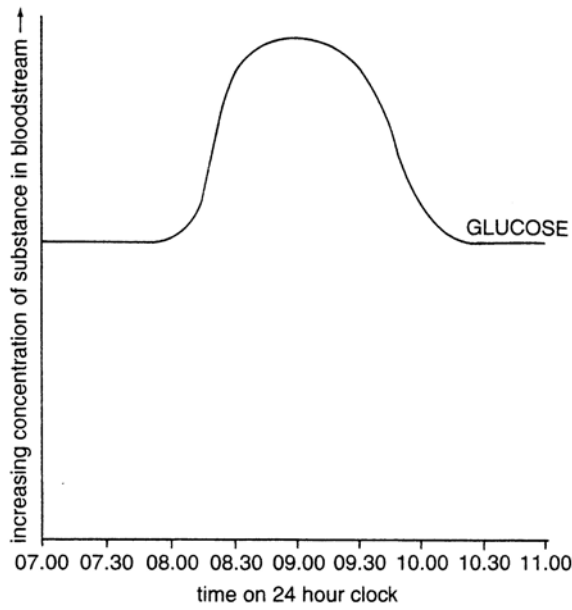
- a. During 07:00 and 08:00 the concentration of glucose in blood is at a steady level. Name the process that maintains blood sugar concentration at a steady level.
 _____ (1 mark)
- b. The glucose was taken up at 08:00. What initial effect did the intake of glucose have on:
 (i) the blood sugar level?

 (ii) the concentration of insulin in the blood?

 (1, 1 mark)
- c. Why was there a short time lag between the two effects mentioned in 'b'?

 _____ (2 marks)
- d. Fatty acids are the breakdown products of fat. What is the effect of increasing the concentration of insulin on the breakdown of fats?
 _____ (1 mark)
- e. Give ONE reason why there is an ever-increasing need for insulin produced by genetic engineering.
 _____ (1 mark)

- f. The following graph shows the glucose tolerance curve when the time was extended to 11:00 hours.



State TWO ways in which the glucose tolerance curve for a sufferer of diabetes would differ from the one shown above.

(2 marks)
Total 9 marks

Section B

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

1. Read the following passage and then answer the questions that follow.

Rob Mills was a first class sprinter noted for his fine muscular physique and athletic qualities. During routine drug testing at the national championships however his blood was found to contain traces of Anapolon 50, a steroid, and he was disqualified. The drug Anapolon 50 is normally used by doctors to treat various forms of anaemia.

- a. Blood is a tissue. Define the term tissue. (2 marks)
- b. Anaemia is a deficiency disease.
 - (i) List TWO symptoms of a person suffering from anaemia.
 - (ii) Explain why anaemia is much more common in women.
 - (iii) Name TWO other deficiency diseases that you have studied about. (2, 2, 2 marks)
- c. The drug Anapolon 50 increases the red blood cell formation. Explain the benefit of an increased red blood cell formation in an athlete. (2 marks)
- d.
 - (i) After taking part in the athletic activity the athlete is sweaty. Explain the benefit of this.
 - (ii) Name the substance that builds up in muscles after heavy exercise and describe its effects. (2, 3 marks)

Total 15 marks

2. Jellyfish and other gelatinous organisms are among the top predators in oceans. These predators eat mostly zooplankton and microscopic swimming crustaceans, but they also eat the eggs and larvae of many fish species, as well as other jellyfish.

- a. Name the phylum to which the following belong:
 - (i) jellyfish
 - (ii) crustaceans (1, 1 mark)
- b. Define the term larva. (2 marks)
- c. Studies show that jellyfish populations may increase with global warming. List ONE cause of global warming. (2 marks)
- d. Transoceanic shipping has accidentally transported several jellyfish species to new locations around the world. List ONE reason why jellyfish have survived in these new habitats. (2 marks)
- e. Sea turtles such as leatherback turtles are predators of jellyfish. Leatherback turtles are considered to be endangered species.
 - (i) Give TWO reasons why leatherback turtles are in danger of extinction.
 - (ii) Like other reptiles, turtles are ectothermic. Explain the term ectothermic.
 - (iii) Reptiles have a dry scaly skin. What is the benefit of this? (4, 2, 1 marks)

Total 15 marks

3. A U.K. led team located two genes on chromosomes six and nine that appear to influence strongly the age at which menstruation starts. One of the two genes also plays a key role in the timing of puberty in both girls and boys.
- a. How many chromosomes are found in:
(i) a human gamete (eg. sperm)
(ii) a skin cell? (1, 1 mark)
- b. In which part of the cell are chromosomes found? (1 mark)
- c. List TWO physical changes that take place at puberty in boys. (4 marks)
- d. In a menstruating female the hormone progesterone stops the secretion of the Follicle Stimulating Hormone (FSH) and Luteinising Hormone (LH).
(i) Name the gland that secretes FSH and LH.
(ii) Name the process that takes place when there is an increase in the secretion of LH.
(iii) Describe what happens to the uterine wall when the secretion of progesterone increases.
(iv) What happens to the secretion of progesterone if the female does not become pregnant? (1, 1, 1, 1 mark)
- e. If a female becomes pregnant implantation occurs about one week after fertilisation.
(i) Explain what happens in the process of implantation.
(ii) Explain why menstruation does not take place in a pregnant female. (2, 2 marks)

Total 15 marks

4. Give a biological explanation for **each** of the following statements:

- a. Red blood cells burst when placed in water.
- b. Monozygotic twins are identical.
- c. Conifers have needle-like leaves.
- d. Enzymes are biological catalysts specific in their action.
- e. Sea birds are badly affected by oil pollution. (3, 3, 3, 3, 3 marks)

Total 15 marks

5. Discuss the:

- a. role of diet to prevent constipation
- b. role of blood in body defence
- c. role of natural birth control methods to prevent pregnancy
- d. importance of air in soil
- e. role of good farming practices to prevent soil erosion. (2, 3, 4, 3, 3 marks)

Total 15 marks