



Candidate's Name **HO & BIOLOGY DEPT**

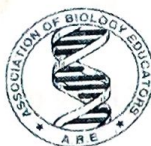
Signature..... **SCZ**

PROPOSED
MARKING GUIDE

Random No.					Personal No.				

(Do not write your School/Centre Name or Number anywhere on this booklet.)

553/1
BIOLOGY
(Theory)
Paper 1
Jul./Aug. 2018
2½ hours



ASSOCIATION OF BIOLOGY EDUCATORS (ABE)

Uganda Certificate of Education

BIOLOGY
(THEORY)

Paper 1

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of sections A, B and C.

Answer all questions in sections A and B, plus two questions from section C.

Write the answers to section A in the boxes provided, answers to section B in the spaces provided, and answers to section C in the answer booklets provided.

For Examiners' Use Only		
Section	Marks	Examiner's signature & No.
A:	30	
B: No. 31	20	
No. 32	10	
No. 33	10	
C: No.		
No.		
Total		

SECTION A (30 MARKS)

1. Which one of the following **best** describes the function of a cell membrane?
- A. Maintains the cell in shape.
 - B. Controls the substances entering and leaving the cell.
 - C. Controls the substances entering the cell.
 - D. Supports the cell structures.
2. In a green plant, when the rates of respiration and photosynthesis are equal the plant will be
- A. taking in carbon dioxide.
 - B. giving out oxygen.
 - C. taking in carbon dioxide and giving out oxygen.
 - D. giving out water vapour.
3. In a flowering plant, sugars are transported
- A. upwards in the xylem.
 - B. upwards in the phloem.
 - C. upwards or downwards in the phloem.
 - D. upwards or downwards in the xylem.
4. Figure 1 demonstrates a mode of dispersal.

B

C

C

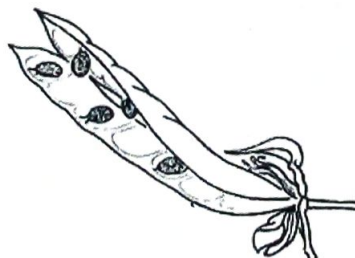


Fig. 1

The seeds in the fruit will be dispersed by

- A. Explosive method.
- B. Water.
- C. Wind.
- D. Animals.

A

5. What name is given to the whole range of chemical changes which are needed just to keep an organism alive?

- A. Basal metabolism.
- B. Catabolism.
- C. Anabolism.
- D. Metabolism.

A



6. Iron is an important component of a balanced diet because it is needed **mainly** by

- A. Nerves.
- B. Bones.
- C. Brain.
- D. Blood.

D



7. When the ventricles contract, blood is forced into

- A. Aorta.
- B. Vena cava.
- C. Pulmonary artery and aorta.
- D. Pulmonary artery.

C



8. The following are human body parts.

- (i) Lungs. (ii) Skin. (iii) Kidneys. (iv) Colon.

Which of the parts are **not** for excretion?

- A. (i) and (ii).
- B. (i) and (iii).
- C. (ii) and (iii).
- D. (ii) and (iv).

D



9. Figure 2 illustrates the “lock and key” mechanism of enzyme action.

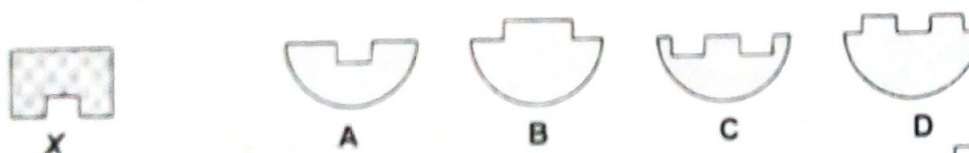


Fig. 2

C



Which of the following substrates, represented by A, B, C and D would be worked on by enzyme X?

10. The process of cell division by meiosis takes place only in

- A. Skin cells.
- B. Red bone marrow.
- C. Reproductive organs.
- D. Lymphocytes.

C

11. A male, homozygous dominant black mouse is mated with a homozygous recessive female brown mouse. The black genotype is **BB**, the brown genotype is **bb**. What would you expect the offspring to be?

- A. All brown.
- B. All black.
- C. 50% black and 50% brown.
- D. All intermediate in colour.

B

12. In a food chain, the amount of energy passed from one trophic level to the next

- A. Increases.
- B. Decreases.
- C. Remains constant.
- D. Sometimes increases, sometimes decreases.

B

13. Which of the following gases causes acid rain?

- A. Ozone.
- B. Carbon monoxide.
- C. Carbon dioxide.
- D. Sulphur dioxide.

D

14. If a person with a wound contaminated by soil is given an anti-tetanus injection which contains anti-tetanus antibodies, this is an example of

- A. Passive immunity.
- B. Active immunity.
- C. Artificial immunity.
- D. Drug therapy.

A

15. Which of the following are the reproductive organs of a flowering plant?

- A. Petals and sepals.
- B. Style and stigma.
- C. Pollen nucleus and egg cell.
- D. Stamens and ovary.

C



16. The force responsible for water travelling up a tree is generated **mainly** by

- A. Evaporation from the leaves.
- B. Root pressure.
- C. Active transport.
- D. Osmosis.

A



17. In order to germinate, **most** seeds need

- A. Water, carbon dioxide, sunlight and suitable temperature.
- B. Water, oxygen, nitrates, and suitable temperature.
- C. Water, oxygen and suitable temperature.
- D. Water, oxygen and light.

C



18. In the small intestine, the villi

- A. Speed up digestion.
- B. Propel food through the intestine.
- C. Increase the absorptive surface.
- D. Secrete digestive enzymes.

C



19. Where in the lungs does gas exchange take place?

- A. Alveoli.
- B. Bronchioles.
- C. Bronchi.
- D. Trachea.

A



20. In a flowering plant, the *spongy mesophyll* is to be found in the

- A. Roots.
- B. Stem.
- C. Leaf.
- D. Fruit.

C



21. Why is humus (organic matter) an important part of soil?

- A. Improves water infiltration.
- B. Breaks down organic pollutants.
- C. Converts nitrogen in the air into nitrates used by plants.
- D. It is rich in nutrients, which is important for fertility.

D

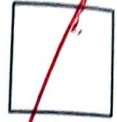


22. The following are some responses of the body to stimuli.

- (i) Jumping in response to car tyre burst.
- (ii) Balancing on a bicycle.
- (iii) Walking without thinking about it.
- (iv) Blinking when a particle of sand blows into the eye.

Which of the responses can be categorised as **reflex action**?

- A. (i) and (iv).
- B. (i) and (iii).
- C. (ii) and (iv).
- D. (ii) and (iii).



23. Figure 3 shows stages of a menstrual cycle. During which stage is a woman most fertile?

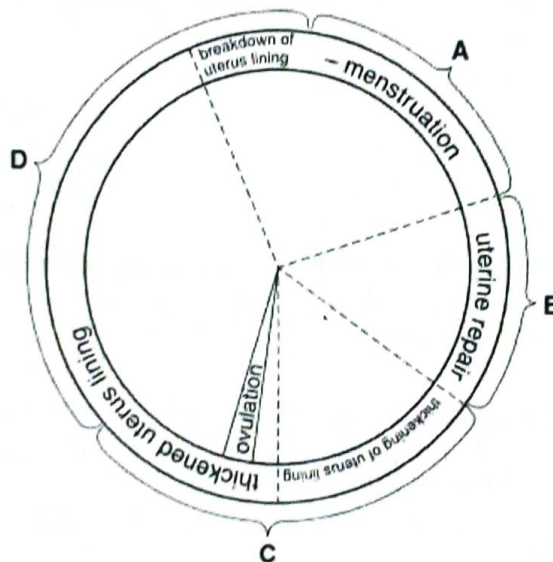


Fig. 3



24. Fungi have the potential to produce large numbers of offspring by

- A. Producing many seeds.
- B. Sexual reproduction.
- C. Producing fruits.
- D. Producing many spores.



25. The effect of insulin is to

- A. Increase the release of glucose from the liver.
- B. Increase the amount of glucose stored in the liver.
- C. Increase the amount of glucose taken up by the tissues.
- D. Reduce the amount of glucose stored in the tissues.

C



26. Tooth decay is caused **mainly** by

- A. Plaque.
- B. Failure to brush the teeth regularly.
- C. Bacterial activity.
- D. Sugar.

C



27. In the nitrogen cycle, the bacteria which can convert nitrogen in the air into nitrates are called

- A. Nitrate bacteria.
- B. Denitrifying bacteria.
- C. Nitrifying bacteria.
- D. Nitrogen-fixing bacteria.

D



28. In the human ear cochlea, firing off impulses from receptor cells is caused by

- A. Tilting of the head.
- B. Bending of Otolith.
- C. Vibrations of inner fluid.
- D. Sound waves hitting on the eardrum.

C



29. What is **not** a feature of natural selection?

- A. Competition for resources.
- B. Production of many offspring.
- C. Selection by humans.
- D. Variation within the population.

C



30. Which of the following lists contains **only** arthropods?

- A. Annelids, insects, millipedes.
- B. Arachnids, crustaceans, millipedes.
- C. Crustaceans, insects, molluscs.
- D. Insects, millipedes, nematodes.

B



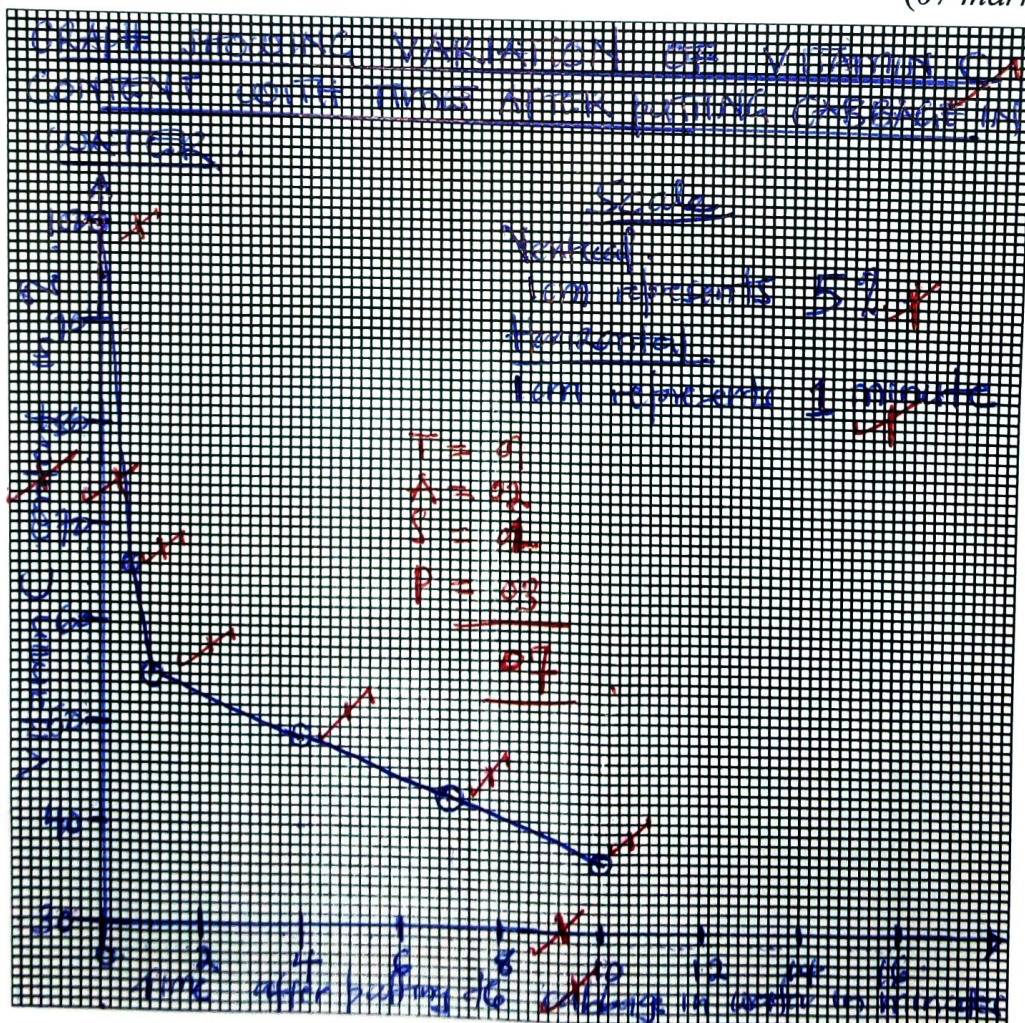
SECTION B (40 MARKS)

31. Scientists carried out an experiment to find the effect of cooking cabbage on the vitamin C content in it. Cabbage leaves were placed in boiling water for 10 minutes. The vitamin C content was determined at intervals, expressing it as a percentage of the amount in the uncooked cabbage. The results are shown in table 1. Study the information and answer the questions that follow.

Table 1

Time after putting the cabbage in water (Minutes)	Vitamin C content (%)
0	100
0.5	66
1	55
4	49
7	43
10	37

- (a) Plot a graph in the space below to represent the information in table 1. (07 marks)



- (b) From the graph, describe the effect of boiling time on the vitamin C content in cabbage. (03 marks)

from 0 minute to 1 minute, Vitamin C content decreases rapidly.
from 1 minute to 10 minutes, Vitamin C content decreases gradually.

03

- (c) (i) Calculate the percentage change in the vitamin C content of cabbage during the period of the experiment. (02 marks)

$$\begin{aligned} &= (\text{Vitamin C content at 0 minute} - \text{Vitamin C content at 10 minutes}) \\ &= (100 - 37)\% \\ &= 63\% \end{aligned}$$

02

- (ii) Suggest reasons why the vitamin C content in the cabbage changes with boiling time. (02 marks)

Vitamin C content in the cabbage decreases with increase in boiling time. Because high temperature destroys vitamin C.

02

- (d) Describe an experiment that could be performed to test for and compare the vitamin C content in different solutions. (04 marks)

To 1 cm³ of DCPIP solution in test tube would add the solution dropwise, then count number of drops of a solution required to decolourise Deep blue DCPIP solution. The fewer the drops, the more vitamin C.

04

- (e) From the results of the experiment, what nutritional advice would you give to a vegetarian about feeding on vegetables? (02 marks)

Not to strongly boil vegetable, high temperature destroys vitamin C.

02

32. (a) State **two** receptors in the human body that are sensitive to chemicals and briefly describe the **nature** of stimuli they respond to. (04 marks)

Tongue / Taste buds sensitive to taste of chemicals in solution. 4
Nose sensitive to smell of chemicals.

- (b) Describe the changes in each of the following parts of the eye when a person looks from a near object to a distant object.

- (i) Pupil (01 mark)

The pupil widens. 9

- (ii) Lens (01 mark)

Becomes thinner / less convex. 9

- (c) Figure 4 shows changes in the contraction of the ciliary muscles as a person watches a humming bird move from flower to flower while feeding on nectar.

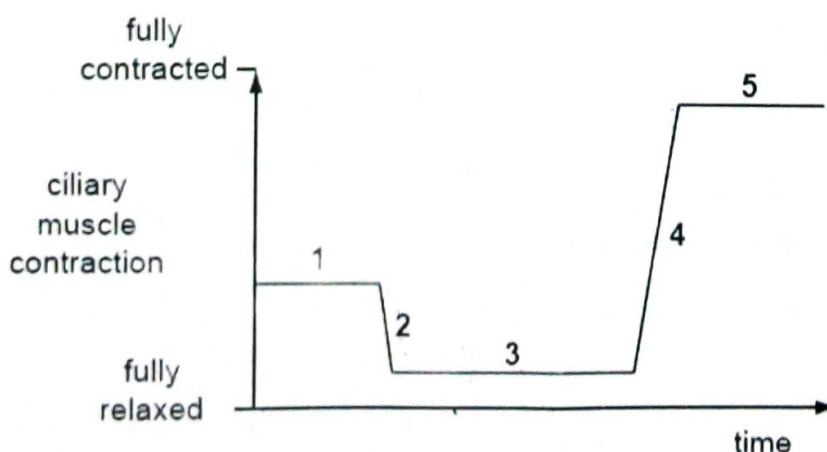


Fig. 4

In which period of time indicated 1, 2, 3, 4 or 5, was the bird?

- (i) Feeding from a flower very near to the person, (01 mark)

..... 5; ✓

- (ii) Flying away from the person, (01 mark)

..... 2; ✓

- (iii) Flying towards the person, (01 mark)

..... 4; ✓

- (iv) Feeding from a flower very far from the person. (01 mark)

..... 3; ✓

33. Figure 5 shows the route taken by blood around the mammalian body.

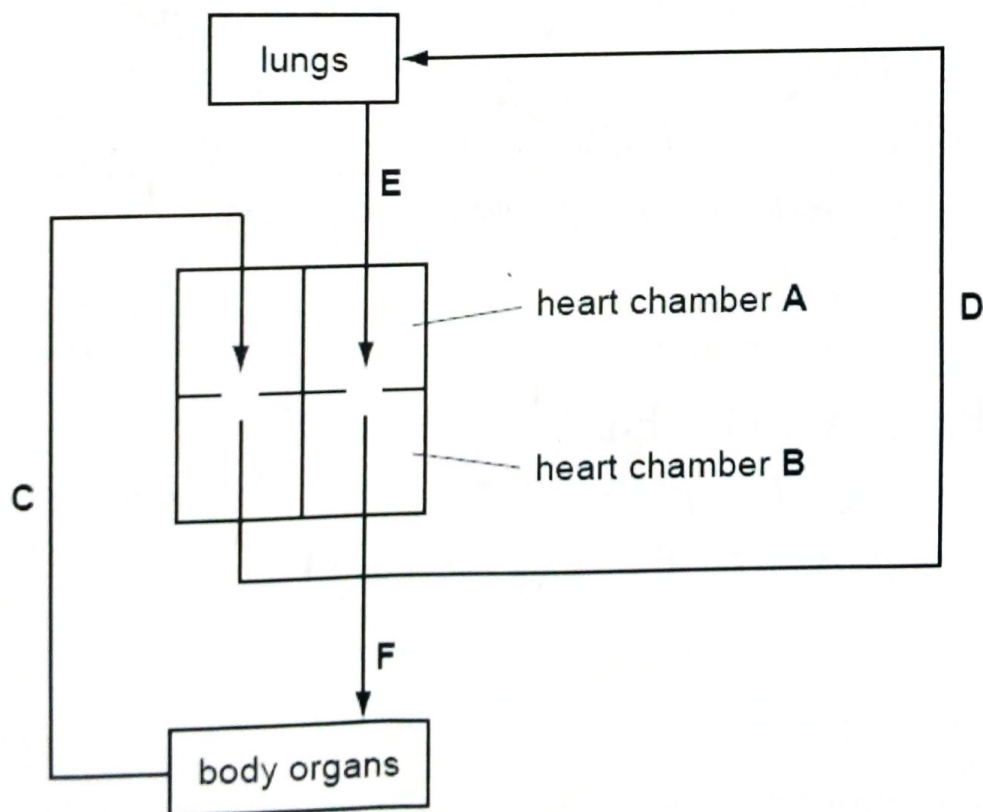


Fig. 5
11

- (a) (i) Name the heart chambers **A** and **B**.

A..... Left atrium; ✓.....(01 mark)

B..... Left ventricle; ✓.....(01 mark)

- (ii) Using information shown in Figure 5, identify the **type** of blood vessel **C**. Give a reason for your answer.

Type of vessel..... vein; ✓.....(01 mark)

Reason..... transport blood towards the heart; ✓.....(01 mark)

- (b) (i) State and explain **two** differences between the contents of the blood flowing in vessels **C** and **E**. (04 marks)

- Blood flowing in vessel **E** has more oxygen than blood flowing in vessel **C**; ✓ because blood vessel **E** picks oxygen from the lungs during gas exchange; ✓
- Blood flowing in vessel **E** has less oxygen than blood flowing in vessel **C**; ✓ because carbon dioxide is produced during respiration by body organs; ✓

- (ii) Suggest and explain which of the four blood vessels contains blood at the highest pressure. (02 marks)

Blood vessel F; ✓
Because, transports blood from left ~~ventricle~~ ventricle of the heart to body organs; ✓