Candidate's Name: .....

School:.....

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Signature:.....

Centre No.					Personal No.		
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553/1

BIOLOGY

(Theory)

Paper 1

July/Aug. 2023

2½ hours

HOIMA DIOCESE EXAMINATIONS BOARD

UCE Mock Examination, 2023

BIOLOGY
(THEORY)

Paper 1

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of three sections A, B *and* C.
Answer **all** *questions in section* 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 and No.
A	No. 1-30		
B	No. 31		
	No. 32		
	No. 33		
C	No.		
	No.		
Total			

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SECTION A: (30 MARKS)

Answer **all** *questions in this section. Write the letter representing the correct answer to the question in the boxes provided.*

1. Which one of the following is used to decide whether a leaf is compound?

   A. Type of venation.
   B. Presence of leaflets.
   C. Type of leaf stalk.
   D. Nature of leaf margin.

2. Of the carbohydrate sets below, which ones are monosaccharides?

   A. Lactose, maltose and sucrose.
   B. Lactose, maltose and glycogen.
   C. Sucrose, lactose and cellulose.
   D. Glucose, fructose and galactose.

3. Which one of the following soil features is least contributed by humus?

   A. Improving soil aeration.
   B. Reducing soil erosion.
   C. Improving water retention.
   D. Improving soil fertility.

4. An open circulatory system is characteristic of

   A. earth worm.
   B. Grasshopper.
   C. Man.
   D. Hydra.

5. Of the following, which one is a characteristic feature of class Arachnida?

   A. Lack of antennae.
   B. Have compound eyes.
   C. Have many appendages.
   D. Have three body parts.

6. Insects excrete nitrogenous compounds in the form of

   A. ammonia.
   B. urea.
   C. uric acid.
   D. nitrogen salts.

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7. The drawing in **figure 1** below is of a mammalian bone.

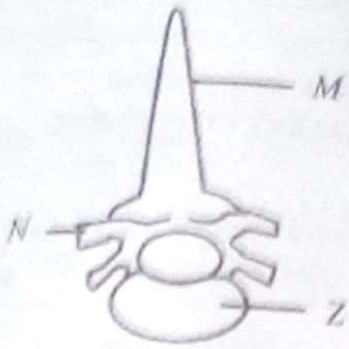

Fig. 1

The parts labelled *N*, *M*, and *Z* are respectively:

A. Transverse process, Centrum, Neural spine.
B. Transverse process, Centrum, Neural Canal.
C. Centrum, Neural spine, Transverse process.
D. Transverse process, neural spine, Centrum.

8. Which one of the following does not help a plant to reduce transpiration?

A. Flattened stem.
B. Sunken stomata.
C. Hairy leaves.
D. Reduced leaves.

9. In which of the following blood vessels is the highest concentration of absorbed food likely to be found soon after digestion of food in humans?

A. Hepatic artery.
B. Hepatic vein.
C. Venacava.
D. Hepatic portal vein.

10. Of the alternatives given below, which one is the function of the lateral line in fish?

A. Providing buoyancy.
B. Providing direction.
C. Stabilize fish in water.
D. Detecting vibrations in water.

11. Control of breathing in mammals is

A. completely voluntary.
B. majorly influenced by the level of CO_2 in the blood.
C. controlled by the blood pressure in the arteries.
D. largely according to the level of the oxygen in the blood.

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12. Many small animals use their skin as the only respiratory surface because they

A. are not large enough to have lungs.
B. have a large surface area compared to their body volume.
C. use less energy and therefore less oxygen than larger animals.
D. are faster runners than large animals.

13. Some bacteria which live in the large intestines are useful in the production of vitamins which are beneficial in the human body. This type of association is

A. saprophytism.
B. commensalism.
C. parasitism.
D. mutualism.

14. In a sweet potato, the organ that is modified for food storage is the

A. root.
B. stem.
C. leaves.
D. buds.

15. In an experiment to determine the percentage of air in a soil sample, the following results were obtained:

Volume of soil added to measuring cylinder	=	40 cm^3
Volume of water added to same measuring cylinder	=	40 cm^3.
Volume of soil + water after stirring	=	75 cm^3.

What was the percentage of air in this soil sample?

A. 6.7
B. 5.0
C. 12.5
D. 53.3

16. Of the following, which one is an example of continuous variation?

A. Height of students in a class.
B. Blood groups among humans.
C. Types of combs among chickens.
D. Eye colour among humans.

17. Which one of the following conditions may result from under secretion of thyroxine?

A. Enlarged thyroid gland.
B. Increased metabolism.
C. Protruding eye balls.
D. Loss of weight.

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18. Cubes *P*, *Q*, *R* and *S* of the same dimensions were cut out from the same raw Irish potato, whose sap had a sugar concentration of 22%. The cubes were then placed in test tubes each containing a sugar solution of a different concentration as shown in the table below:

Cube	Sugar concentration of solution (%)
P	15.0
Q	26.0
R	21.5
S	44.0

Which cube will be longest after 4 hours?

A. *P*
B. *R*
C. *Q*
D. *S*

19. Which one of the following equations represents anaerobic respiration in plants?

A. Glucose → Carbon dioxide and water.
B. Glucose → Carbon dioxide + alcohol + energy.
C. Glucose → Water + alcohol+ energy.
D. Glucose → Carbon dioxide + energy.

20. Which of the following is usually associated with organisms whose reproduction involves external fertilization?

A. Production of large number of eggs.
B. High parental care of the offspring.
C. Early weaning of young ones.
D. High dependence of the embryo on the mother.

1. When a seedling is fixed on a rotating klinostat and placed in a horizontal position, the shoot continues growing horizontally because

A. auxins accumulate on the lower side of shoot.
B. production of auxins stops.
C. auxins are uniformly distributed in the shoot.
D. auxins accumulate on the upper side of the shoot.

2. The disadvantage the amoeba has in using binary fission is that

A. the process is slow.
B. it occurs only in aquatic environment.
C. few offsprings are produced.
D. there is no variation among offspring.

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23. Figure 2 below shows a Rhizopus.

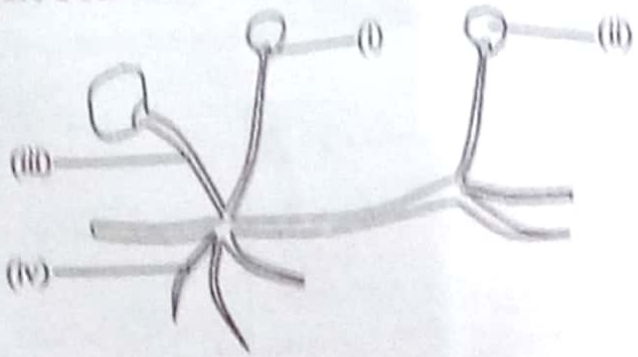

Fig. 2

Which of the structures indicated are adapted for nutrition and reproduction respectively?

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

24. Which one of the following occurs in a mammal which is in a cold environment?

A. More blood flows to the skin.
B. Metabolic rate decreases.
C. Vasoconstriction of skin arterioles occurs.
D. Erector pili muscles relax.

25. In **figure 3** below, L1, L2, and L3 represent insect legs on the left side of the body and R1, R2 and R3 represent insect legs on the right side of the body. Which one of the following represents the correct set of legs moved together during locomotion?

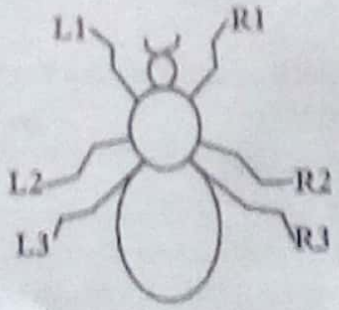

Fig. 3

A. L1, L2, R1.
B. L1, L3, R2.
C. L2, L3, R2.
D. L3, L2, R3.

26. Lactic acid produced in muscles is got rid of by

A. Oxidation.
B. storing it in the liver.
C. converting it to ethanol.
D. converting it to fat.

27. A somatic cell in an organism contains 24 pairs of chromosomes. The number of chromosomes in a gamete of this organism is

A. 24
B. 12
C. 48
D. 6

28. The forces which mostly help water to move up a tall plant are

A. Osmosis and diffusion.
B. Capillarity and transpiration.
C. Osmosis only.
D. Capillarity and osmosis.

29. Which one of the following uses gills, skin, buccal cavity and lungs for gaseous exchange at some point in their life cycle?

A. Amphibians.
B. Fish.
C. Reptiles.
D. Birds.

30. The sequence below shows the organisms involved in a food chain.

Plants ⟶ caterpillars ⟶ predatory bugs ⟶ birds

In this food chain, what do you expect to happen if the number of predatory bugs is increased?

A. A decrease in the number of birds.
B. An increase in the number of plants.
C. An increase in the number of caterpillars.
D. A decrease in the number of plants.

SECTION B (40 MARKS)

Answer all questions in this section.

Answers must be written in the spaces provided.

31. In an experiment, five identical shoots of Elodea were placed in separate test tubes of pond water in which dilute solution of sodium hydrogen carbonate had been added. Test tube 1 was exposed to light from a 30-watt bulb placed at a distance of 10 cm, and the number of bubbles evolved per minute recorded. This was then repeated for test tubes 2, 3, 4 and 5 at distances of 15 cm, 20 cm, 25 cm, and 30 cm respectively. The results are shown in the table below.

Test tubes	Distance from the source of light	Number of bubbles evolved per minute
1	10	120
2	15	120
3	20	54
4	25	30
5	30	17

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(a) What was the aim of the experiment? *(01 mark)*

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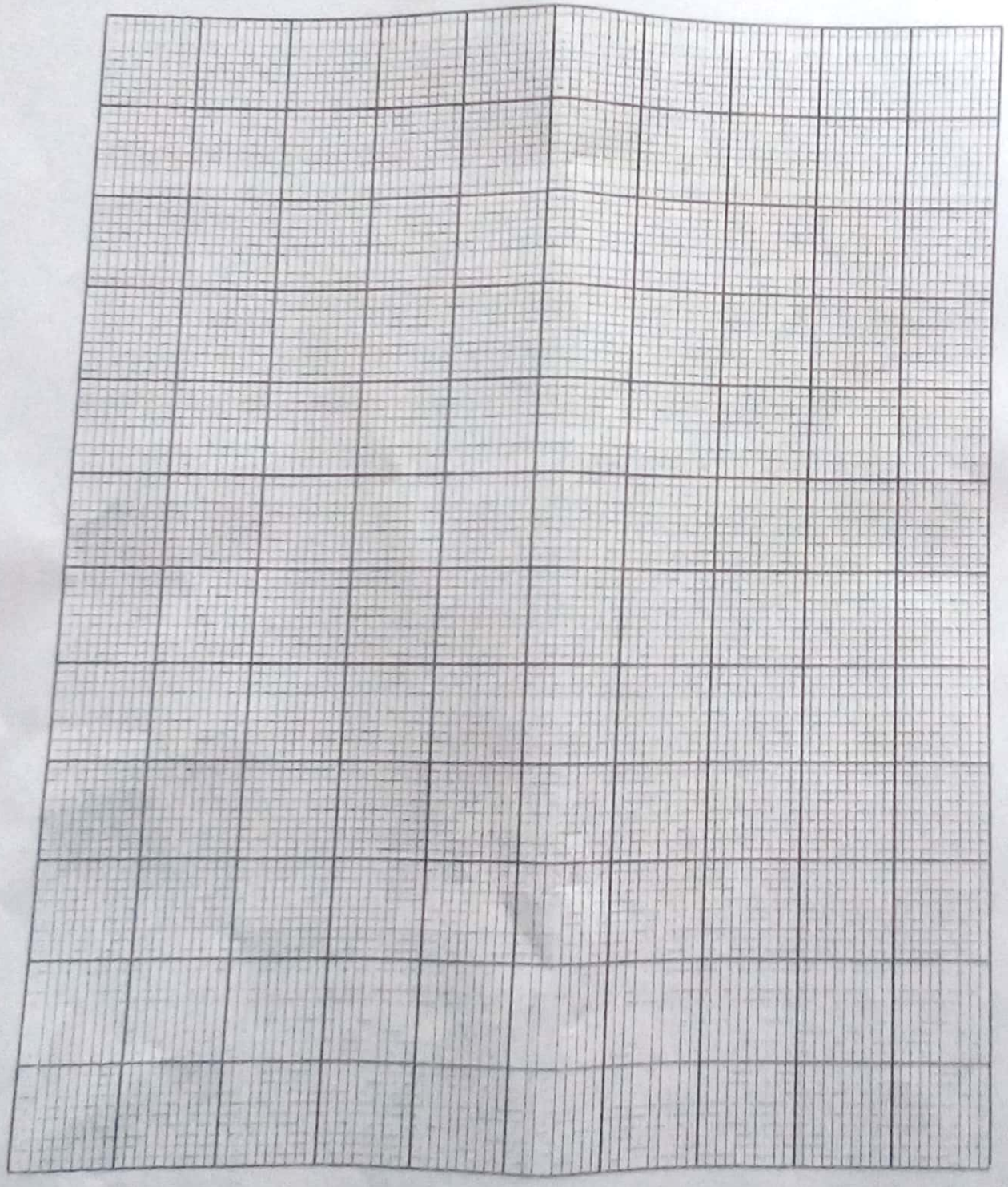
(b) Plot the graph to represent the information in the table above. *(06 marks)*



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(c) Using the graph you have drawn, determine the number of bubbles when the source of light is 17 cm from the test tube. *(01 marks)*

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(d) Using the information provided, explain the observations:

(i) At 10 cm from the test tube. *(03 marks)*

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(ii) From 15 cm to 30 cm distance from the test tube. *(04 marks)*

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(e) Explain why dilute solution of sodium hydrogen carbonate was added to pond water in the test tubes. *(02 marks)*

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(f) Suggest an explanation for what would have been observed in the experiment if the distance from the light source was reduced further to 9 cm. *(02 marks)*

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(g) Other than producing oxygen, state one other importance to humans of the process occurring in the test tubes. *(01 mark)*

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32. (a) Explain how the retina is adapted to its functions. *(03 marks)*

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(b) Explain the effect of the following movements of the different parts of the eye.

(i) Contraction of the iris. *(02 marks)*

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(ii) Relaxation of ciliary muscle. *(03 marks)*

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(iii) Shortening and thickening of the lens. *(02 marks)*

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33. (a) (i) Distinguish between cross pollination and self-pollination. (02 marks)

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(ii) Give **three** structural features of flowers that ensure cross pollination. (03 marks)

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(b) Give **five** adaptations of flowers for insect pollination. (05 marks)

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SECTION C (30 MARKS)

Attempt any **two** *questions from this section. Answers to these questions* **must** *be written in the answer booklets provided. Additional question(s) answered will* **not** *be marked.*

34. (a) Explain how the following are achieved:

(i) Flapping in birds. (03 marks)

(ii) Forward movement in tilapia fish. (03 marks)

(b) Give **four** reasons for active locomotion in organisms. (04 marks)

35. (a) Describe the activities of digestion which occur in each one of the following parts of the elementary canal.

(i) The stomach. *(03 marks)*

(ii) The ileum. *(05 marks)*

(b) Give the adaptations shown by the ileum to the process of food absorption. *(07 marks)*

36. (a) What is meant by the term **allele**? *(02 marks)*

(b) A red flowered plant was crossed with a white flowered plant of the same species. All the F1 plants had red flowers.

(i) Without using genetic symbols explain the F1 phenotype produced. *(03 marks)*

(ii) One of the F1 plants was crossed with a white flowered plant, producing 1064 plants, how many of them had red flowers? Show your working. *(10 marks)*

37. (a) Draw and label a transverse section through a dicotyledonous stem. *(04 marks)*

(b) State the functions of any **two** parts labelled. *(02 marks)*

(c) With examples, explain how stems are adapted to perform their functions. *(09 marks)*

END

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