

553/1
BIOLOGY
(Theory)
Paper 1
2 ½ hours

Uganda Certificate of Education
553/1 BIOLOGY
(Theory)
Paper 1
2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of sections A, B, and C.

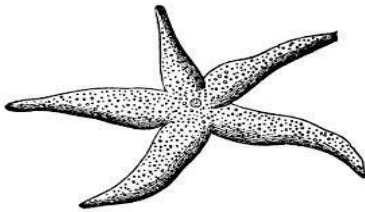
*Answer **all** questions in Sections A and B, plus **two** questions in Section C.*

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		
B	No. 31	
	No. 32	
	No. 33	
C	No.	
	No.	
TOTAL		

1. The animal in figure below belongs to phylum?

A. Mollusca



B. Echinodermata

C. Arthropoda

D. Chordata

2. A drop of fresh mammalian blood was mixed with salt on a slide. After a few minutes the blood was observed under the microscope. The red cells were found to have,

A. swollen up

B. shrunk in size

C. remained the same size

D. lost their red colour

3. Which stage in the life cycle of a butterfly is both useful and destructive?

A. Adult butterfly B. Pupa C. Eggs D. Larva

4. What is meant by community in the study of ecology?

A. people living together

B. Different species living in the same environment.

C. Members of the same species living in a habitat

D. Members of a species that are producers

5. A student performed an experiment to determine the volume of air in a soil sample. The following were his readings

- volume of water in measuring cylinder470cm³

- volume of soil added to water.....350cm³

- volume of water and soil after stirring800cm³

Which one of the following is the volume of air in a soil sample?

A. 330cm³

B. 20cm³

C. 120cm³

D. 30cm³

6. Which of the following pair of structures possessed by tilapia, provides the major force which drives it forward.

A. Caudal fin and myotome muscles

B. Swim bladder and myotome muscles

C. Pelvic fins and Caudal fin

D. Pectoral fins and caudal fins

7. Which one of the following is the correct sequence for succession of organisms on a bare rock?

- A. Mosses → herbs → trees → lichen
- B. Lichen → mosses → herbs → shrubs
- C. Trees → herbs → mosses → Lichen
- D. Herbs → lichen → trees → mosses

8. Which one of the following is the best definition of wildlife?

- A. Both plants and animals that occur in a habitat
- B. All animal which are not domesticated
- C. All uncultivated plants and non – domesticated animals
- D. All living things in nature

9. What is meant by oxygen debt? Amount of oxygen used

- a. by muscles cells to breakdown food to generate energy
- b. to breakdown accumulated lactic acid in muscles
- c. to maintain life
- d. by muscles to generate excess energy during heavy exercise.

10. Which one of the following is deficiency symptoms of vitamin C?

- a. Reduced night vision
- b. Weak bones
- c. Bleeding from gums
- d. Prolonged bleeding

11. Which one of the following is a path taken by air into the body of an insect?

- A. Spiracle → trachea → alveolus.
- B. Spiracle → trachea → tracheole
- C. Spiracle → trachea → bronchiole
- D. Spiracle → bronchiole → tracheole

12. Which action of muscles will cause raising of the lower arm?

- a. Contraction of both triceps and biceps.
- b. Contraction of biceps and relaxation of triceps
- c. Contraction of triceps and relaxation of biceps
- d. Relaxation of both triceps and biceps

13. Which of the following are end products from digestion of cane sugar?

- A. Sucrose and maltose.
- B. Glucose and fructose.
- C. Maltose and galactose.
- D. Fructose and galactose

14. The following are components of axial skeleton of mammals, except:

- A. Sternum
- B. Vertebrae

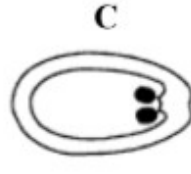
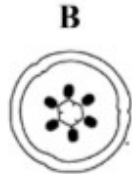
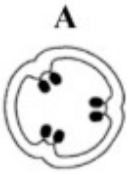
- C. Ribs
- D. Girdles

15. Which of the following is the most accurate method of measuring growth of an organism

- A. Fresh mass
- B. Dry mass

- C. Linear dimension of length
- D. Number of cells

16. Which one of the following is showing free central placentation



17. Which one of the following parts of a seedling grows rapidly to bring about hypogeal germination?

- a. Cotyledons
- b. Epicotyl

- c. Plumule
- d. Hypocotyl

18. Aerobic respiration is more efficient than anaerobic

- A. uses more oxygen.
- B. yields lactic acid.

- C. uses less oxygen.
- D. yields more energy.

19. Which of the following types of skeletons is composed of bone and cartilage
- A. Endoskeleton
 - B. Exoskeleton
 - C. Hydrostatic skeleton
 - D. Endoplasmic skeleton

20. Which one of the following does not aid flight in birds?
- A. Pectoral muscles.
 - B. Hollow bones.
 - C. Quill feathers.
 - D. Down feathers

21. The following are features found in birds.
- (i) Light bones
 - (ii) Webbed feet.
 - (iii) Presence of feathers.
 - (iv) Streamlined body.

Which of the features are adaptations for flight?

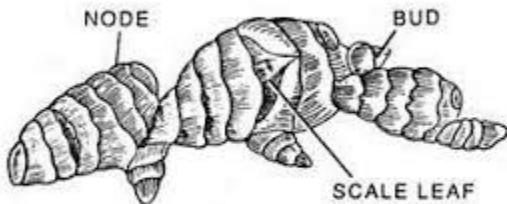
- A. (i) and (ii)
- B. (ii) and (iii)
- C. (iii) and (iv)
- D. (ii) and (iv)

22. A microscope filled with a X5 eyepiece and a X20 objective lens will magnify an object.
- A. X100
 - B. X25
 - C. X250
 - D. X4

23. The organism that moves by means of its cilia is?
- A. Amoeba
 - B. Euglena
 - C. Paramecium
 - D. Bacteria

24. At what level of organization can the heart muscles be found?
- A. Cell level
 - B. Tissue level
 - C. Organ level
 - D. System level.

25. The figure below is of a modified stem. Which one of the following represents the figure?



- A. Corm
- B. Stolon
- C. Rhizome
- D. Runner

26. The tissue responsible for conducting water to the leaves from the roots is.....
- A. Parenchyma
 - B. Cortex
 - C. Phloem
 - D. Xylem

27. Correct order in which impulses pass through the ear bones is
- A. Incus-smallaeus-strapes
 - B. Stapes-incus-mallaeus
 - C. meallaeus – incus-stapes
 - D. Mallaesus-stapes-incus

28. Which one of the following is NOT a characteristic of insects?
- A. Two pairs of antennae
 - B. Jointed legs
 - C. External skeleton

D. Body divided into head, thorax and abdomen

29. Which one of these methods is not important in the maintenance of soil fertility on a given piece of land?
- A. Practicing crop rotation.
 - B. Addition of organic manure.
 - C. Maintaining of vegetation cover.
 - D. Burning of the grass in the plot regularly.
30. Which one of the following methods would be the best for estimating the population density of rats in a bush?
- A. Direct counting
 - B. Quadrat method
 - C. Line transect
 - D. Capture –recapture method

Answers to Section A

1.	7.	13.	19.	25.
2.	8.	14.	20.	26.
3.	9.	15.	21.	27.
4.	10.	16.	22.	28.
5.	11.	17.	23.	29.
6.	12.	18.	24.	30.

SECTION B (40 Marks)

31. A desert fox was dipped in cold water and removed after some time. Its body temperature was monitored from the time it was dipped. Results are recorded in the table below.

Time in minutes	0	4	10	20	35	50
Body temperature in $^{\circ}\text{C}$	38.5	38.5	38.0	36.0	37.5	38.5

(a) Plot a graph of these results in the space provided (06 marks)

(b) Using the graph in (a) above,

Suggest with reasons

(i) How long the fox was in water (02 marks)

.....
.....
.....

(ii) The normal body temperature of the fox (02 marks)

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.....
.....

(c) Explain the changes in body temperature

(i) 4 minutes to 20 minutes (02 marks)

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.....

(ii) 20 minutes to 50 minutes (04 marks)

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(d) From the information provided suggest any two long term structural adaptations of this mammal to the high temperatures in the desert

(i) (02 marks)

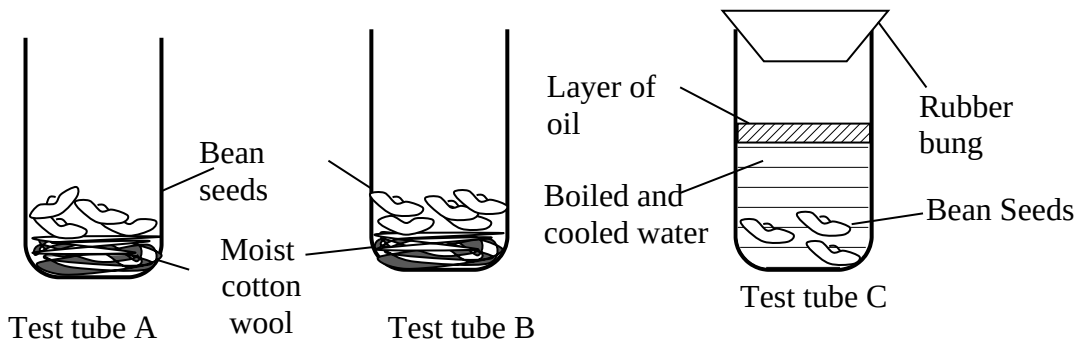
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(ii) (02 marks)

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32. The experimental set up below is to investigate the environmental conditions affecting germination.

Test tube A and C are placed in the laboratory at 30°C, while test tube B in refrigerator at 4°C. Study the set up and answer questions that follow:



(a) What is the purpose of

(i) Boiling water in test tube C (01 mark)

.....

(ii) Keeping test tubes A and C at temperature 30 °C (01 mark)

.....

(b) Explain what is observed after five days to seeds in

(i) Test tube A (02 marks)

.....

(ii) Test tube B (03 marks)

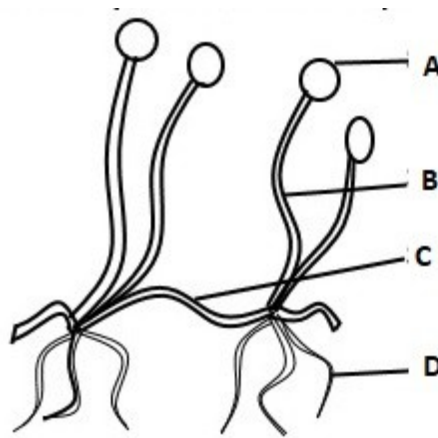
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(iii) Test tube C (03 marks)

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33. Study the figure below and answer the questions that follow.



(a) Name the parts labelled (4 marks)

A.....
B.....
C.....
D.....

(b) State the functions of the parts labelled (3 marks)

A.....
.....
C.....
.....
D.....
.....

(c) What form of nutrition does the structure above use (1 mark)

.....

(d) Explain the importance of the structure above in the ecosystem (2 marks)

.....
.....
.....

Section C (attempt only two questions from this section)

34. (a) What is **growth**? (01 mark)
- (b). State three differences between growth in plants and in animals (03 marks)
- (c). Describe how germination occurs in a named dicot seed. (05 marks)
- (d). Describe an experiment to show that oxygen is necessary for germination. (06 marks)
- 35 (a) What is a parasite (1 marks)
- (b). Describe the life cycle of a tapeworm (5 marks)
- (c). Give any 6 adaptations of tapeworms to its parasitic mode of life (6 marks)
- (d). Give any three ways of controlling tapeworms (3 marks)
- 36 (a). Describe how flight is brought about in birds (7 marks)
- (b). Give the adaptations of birds for flight (8 marks)
37. (a). Explain how a solid starchy food is broken down from the time it is taken into the mouth to the time it is absorbed in the intestine. (06 marks)
- (b). Describe how the products in (a) above are absorbed and assimilated in man. (03 marks)
- (c). Describe the benefits of the mutualistic relationship between ruminants and their rumen microorganisms to:
- (i) The ruminants (02 marks)
- (ii) The microorganisms (04 marks)

END