NAME: …… INDEX NO: ……

553/1
Biology
(Theory)
Paper 1
June-July 2017
Time: 2 ½ Hours

UGANDA CERTIFICATE OF EDUCATION

BIOLOGY (THEORY)

PAPER 1

TIME: 2 Hours 30 Minutes

INSTRUCTIONS TO CANDIDATES:

- This paper consist of sections **A, B** and **C**
- Answer all questions in Section A and B plus ***TWO*** questions in Section C.
- Answers to Section A are to be written in the boxes provided. Answers to Section B in the spaces provided and those to Section C in the answer sheets provided.

For Examiner's Use Only			
Section		**Marks**	**Examiners signature and No.**
A			
B	**No. 31**		
	No. 32		
	No. 33		
C	**No.**		
	No.		

SECTION A (30 MARKS)

(Write the letter corresponding to the correct answer in the box provided).

1. Which of the following structures is found in animal cells only?
   A. Large central vacuole
   B. Cell membrane
   C. Cytoplasm
   D. Flagella

2. Which one of the following properties of soil is **not** affected by its texture?
   A. Mineral content
   B. Amount of air in the soil
   C. Water retention capacity
   D. Soil capillarity

3. Reduced resistance to disease and poor night vision are likely to occur in an individual as a result of deficiency in vitamin.
   A. C
   B. A
   C. D
   D. B

4. Which one of the following sets of blood vessels carry blood containing the least amount of carbon dioxide and nitrogenous wastes respectively?
   A. Renal artery and pulmonary artery
   B. Vena cava and pulmonary artery
   C. Pulmonary vein and renal vein
   D. Renal artery and vena cava

5. Which of the following is a characteristic of a respiratory surface?
   A. Hairy
   B. Smooth
   C. Large surface area
   D. Thick epithelium

6. Which one of the following sets of conditions can occur at the same time in a mammalian body?
   A. Vasodilatation, increased sweating and contraction of erector pilli muscle
   B. Vasodilatation, reduced sweating and increased metabolic rate
   C. Vasoconstriction, reduced metabolic rate and relaxation of erector pilli muscle
   D. Increased sweating, vasodilatation and relaxation of erector pilli muscle.

7. Which one of the following is a correct statement about the nervous system?
   A. Responses are slow
   B. Its effect is wide spread.
   C. Impulses are carried by the blood
   D. Impulses are electrical in nature

8. Which of the following features is **not** found on lumbar vertebrae?
   A. Neural spine
   B. Centrum
   C. Vertebrarterial canals
   D. Transverse processes

9. Which one of the following is **not** necessary for germination of all seed types?
   A. Water
   B. Light

C. Oxygen D. Warmth

10. Which one of the following is true of insect pollinated flowers?
A. Produce large pollen grains
B. Have large feathery stigmas
C. Produce large quantities of pollen
D. Have long filaments

11. In *Drosophilla*, the gene for long wings is dominant for over that for short wings. Two heterozygous long winged Drosophilla were mated and produced 92 offspring. What was the approximate number of long winged flies?

A. 23
B. 46
C. 69
D. 92

12. Which of the following is the best method for estimating the population of rats in the garden?
A. Total count
B. Capture-recapture method
C. Quadrant method
D. Transects

13. Mosses are;
A. Angiosperms
B. Gymnosperms
C. Pteridophytes
D. Bryophytes

14. A sample of soil was heated in a crucible until it was red. The following were recorded.
Initial weight – A
Final weight – B
A – B = X
X represents ……

A. water in the soil
B. Humus in the soil
C. Humus + water in the soil
D. Air in the soil

15. In which of the following parts of the mammalian gut does most absorption of water occur?
A. Colon
B. Ileum
C. Stomach
D. Duodenum

16. Water movement up the stem of a tree is by
A. Osmosis
B. Diffusion
C. Transpiration pull
D. Active transport

17. The equation, Glucose ⟶ Ethanol + Carbon dioxide + Energy, represents;
A. Aerobic respiration in plants
B. Anaerobic respiration in animals
C. Aerobic respiration in animals

D. Anaerobic respiration in plants

18. Which of the following is **not** a homeostatic organ?
A. Lungs
B. Bladder
C. Kidney
D. Liver

19. A motor neuron;
A. Relays impulses to effectors organs
B. Relays impulses to the spinal cord
C. Relays impulses to intermediate neurons
D. Receives impulses from receptors.

20. Which one of the following is not important for flight in birds?
A. Hollow bones
B. Large chest muscles
C. Streamlined body
D. Down feathers

21. Insect growth is intermittent because of ;
A. Oviduct
B. Placenta
C. Amniotic sac
D. Umbilical cord

22. The structure that protects the mammalian foetus is the;
A. Amniotic sac
B. Oviduct
C. Placenta
D. Umbilical cord

23. Which of the following is sex linked?
A. Albinism
B. Sickle cell anaemia
C. Hemophilia
D. Mongolism

24. Rapid deforestation may lead to increase in
A. Water pollution
B. Growth of algae in water bodies
C. Level of nitrogen in the atmosphere
D. The level of carbon dioxide in the atmosphere

25. One suffers from long sightedness when the image of
A. Far objects are focused in front of the retina
B. Near objects are focused behind the retina
C. Near objects are focused in front of the retina
D. Far objects are focused behind the retina

26. Successful terrestrial life in insects is activated by their possession of
A. Wings
B. Six legs

C. Waxy cuticle

D. Three body parts

27. Figure 1 is a pyramid of number for an ecosystem.

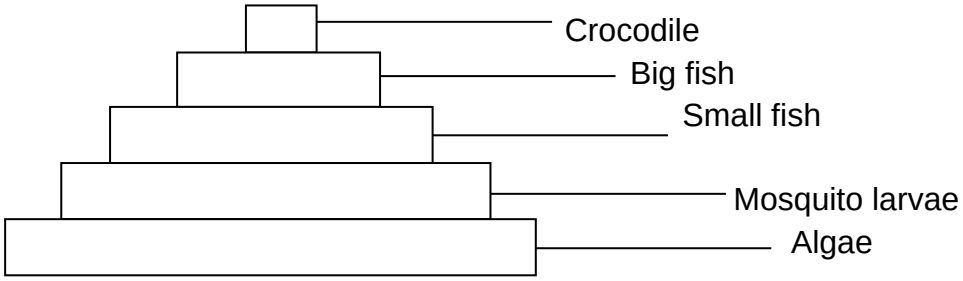

Fig. 1

Which one of the following actions would result in the reduction of the number of mosquito larva?

A. Increase in number of crocodiles
B. Increase in number of big fish
C. Decrease in number of small fish
D. Increase in number of Algae.

28. Which of the following parts of a microscope is used to obtain a sharp image?
A. Fine adjustment knob
B. Mirror
C. Coarse adjustment knob
D. Objective lens

29. The following blood plasma components are involved in blood clotting except:
A. Water
B. Calcium ions
C. Prothrombin
D. Fibrinogen

30. Which of the following is the correct path of water through a plant?
A. Root hairs xylem phloem endodermis
B. Root hairs → cuticle → xylem → stomata
C. Root hairs → phloem → stomata → xylem
D. Root hairs → endodermis → xylem → stomata

SECTION B (40 MARKS)

(Answer all questions in this section. Answers must be written in the spaces provided).

31. The information below was collected by a genetist concerning the number of individuals with their corresponding heights in a given population.

Number of Individuals of('000)	1.5	2.0	5.0	9.0	16.0	22.0	14.0	4.0	3.0
Height (cm)	155	160	167	170	173	176	185	191	195

a) i) Using the information provided, plot a suitable graph to represent the data. (7 mks)

iii) From the graph, determine the number of individuals measuring 180cm in height. (1 mk)

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b) (i) Describe the shape of the graph (3 marks)

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ii) Which type of variation is exhibited by the individuals regarding the character in question? (1 mark)

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iii) Apart from height, outline three other characters that show similar behaviour in man. (3 mks)

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c) Explain

i. The causes of variation among organisms (3mks)

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ii. the role of variation in nature (2 marks)

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32. The table below shows concentration of plasma in relation to glomerular filtrate in the Bowman's capsule and urine.

Table I

Substance	**Plasma g/100cm^3**	**Glomerular filtrate g/100cm^3**	**Urine g/100cm^3**
Plasma protein	7.5	0	0
Glucose	0.1	0.1	0
Sodium ions (Na^+)	0.32	0.32	0.35
Chloride ions (Cl^-)	0.37	0.37	0.60
Urea	0.03	0.03	2.0
Water	91.9	91.0	95.0

(a) (i) Compare the plasma content and glomerular filtrate. (03 Marks)

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(ii) Explain how the above differences and similarities come about. (03 Marks)

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(b) Explain the following observations

i. Urine formation almost stops after serious blood loss (2mks)

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ii. Urine output increases on a cold day (2mks)

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33. (a) What is meant by a recessive allele? (01 Marks)

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(b) Differentiate between phenotype and genotype (02 Marks)

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(c) Albinism is a condition in which external pigment fails to develop. The condition is caused by a recessive allele while the allele for presence of pigment is dominant. Two phenotypically normal parents produced an albino child.

Using suitable symbols give the genotype of the parents, explaining your answer. (04 marks)

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(c) State three practical applications of genetics in agriculture (03 Marks)

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SECTION C (30 MARKS)

34. (a) Describe an experiment to show that oxygen is given off during photosynthesis (8mks)

b) Explain the various mechanisms employed by plants to obtain essential nutrients (7mks)

35. (a) Describe the characteristics of insect pollinated flowers (06 Marks)

(b) Explain how cross pollination is carried out in flowers (06 Marks)

(c) What changes take place after fertilization? (05 Marks)

36. (a) What is meant by parasitism (02 Mark)

b) Explain why a tapeworm is a successful parasite (10 Marks)

c) Distinguish between a parasite and a predator (3mks)

37. (a) i. What are the structural differences between and artery and vein?(03 Marks)

ii. How are these differences related to their function? (03 Marks)

(a) State four differences between blood and lymph (4mks)

(b) Explain why blood group O is a universal donor while AB is a universal recipient (5mks)

END.