NAME:..... CENTRE/ INDEX No.....

SCHOOL..... SIGNATURE:.....

553/1
BIOLOGY
(Theory)
PAPER 1
$2^{1}/_{2}$hours

WAKISSHA

Uganda Certificate of Education

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 sections* **A** *and* **B,** *and any* **two** *questions from section* **C.**
- *Any additional questions answered will not be marked.*
- *Answers to section* **A** *should be written in the boxes provided, on the right side.*
- *Answers to section* **B** *should be written in the spaces provided.*
- *Answers to section* **C** *should be written in the answer booklet/sheets provided.*

For Examiner's use only			
Section		Marks	Examiner's Initials & No.
A			
B	No. 31		
	No. 32		
	No. 33		
C	No.		
	No.		
Total			

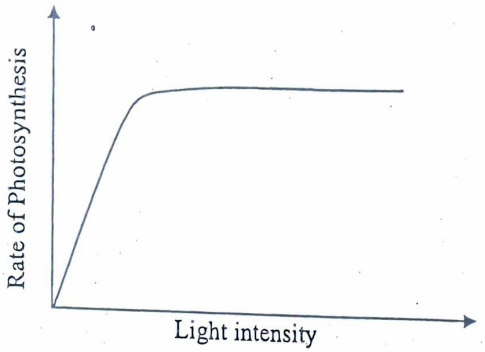
SECTION B (30 MARKS)

Answer all questions in this section.

Write the letter representing the most correct answer to each question in the box provided.

1. Which one of the following best describes a culture solution as used in soil science?
It's a solution.....
   A. that is used to produce cultural plants
   B. that is used to propagate plants from roots.
   C. containing essential plant nutrients used to investigate the effects of nutrients on plant growth.
   D. containing different soil types used to investigate their effects on plant growth.

2. The graph below shows the variation of rate of photosynthesis with light intensity.



Which of these statements is correct about the above graph?
   A. Light intensity increases with increase in rate of photosynthesis.
   B. Light intensity decreases with decrease in rate of photosynthesis.
   C. Light intensity has no effect on rate the rate of photosynthesis.
   D. Initially rate of photosynthesis increases with increase in light intensity then levels off.

3. Which set of structures are used by NEWTS for gaseous exchange?
   A. Skin, mouth and lungs.
   B. Gills, nose and skin.
   C. Lungs, gills and book lungs.
   D. Nose, lungs and trachea.

4. Irregular shaped cells with few chloroplasts and loosely packed cells are characteristic features for;
   A. Palisade layer.
   B. Spongy mesophyll layer.
   C. Lower epidermis.
   D. Upper epidermis.

5. A soil sample characterized by good aeration has
   A. high capillarity.
   B. low drainage.
   C. large soil particles.
   D. small soil particles.

6. A person who has drunk a lot of alcohol usually loses body balance and posture.
Which part of the brain is usually affected?
   A. Cerebrum
   B. Medulla
   C. Cerebellum
   D. Hypothalamus.

Which of the following set of bones, both articulate with sternum?
A. Clavicle and cervical.
B. Lumbar and clavicle.
C. Humerus and scapula.
D. Lumbar and Thoracic

8. Absence of herbivores in an ecosystem would lead to
A. increase in secondary consumers.
B. increase in tertiary consumers.
C. decrease in producers.
D. increase in producers.

9. Which one is the correct number of chromosomes contained in a gamete cell of humans if the somatic cells contains 46 chromosomes?
A. 92
B. 46
C. 23
D. 47

10. If a young growing stem was illuminated from one side only and the later examined under a microscope, what would be the most likely condition of the cell from the darker side in comparison with those from the opposite side with light? They would be
A. more numerous.
B. shorter.
C. less numerous.
D. more elongated.

11. In addition to carbon dioxide, a germinating bean seed respiring anaerobically would also produce
A. water.
B. ethanol.
C. lactic acid.
D. citric acid.

12. Which of the following would have the highest amino acid concentration after a meal?
A. Hepartic artery
B. Hepertic vein
C. Hepartic portal vein
D. Pulmonary artery

13. During experiments on photosynthesis the leaf is left attached to the plant in order to
A. obtain air.
B. obtain water from the soil.
C. absorb sunlight.
D. transport food from the leaf.

14. The main reason for the decrease in humus content of cultivated soil is
A. continuous removal of plant materials after harvesting.
B. consumption of organic matter by earthworms.
C. pollution of soil by pesticides.
D. erosion of soil by wind and rain.

15. An insect does NOT require haemoglobin in its blood because
A. it has no red blood cells.
B. oxygen is carried directly to its body tissue.
C. it does not have lungs.
D. it has an open circulatory system.

16. Which one of these glands secretes a hormone whose normal effect is to influence the rate of heart beat?
A. Islets of Langerhans.
B. Pituitary.
C. Thyroid gland.
D. Adrenal gland.

17. As energy flows a long a food chain, it
A. increases.
B. fluctuates.
C. decreases.
D. increases.

18. A beetle is an insect because it has
A. an exoskeleton.
B. jointed legs.
C. segmented body.
D. three thoracid segments.

19. Which one of the following is an example of continuous variation?
A. Blood groups in man
B. Intelligence
C. Sex in humans
D. Tongue rolling

20. Which of these is a set of organs that take part in homeostasis?
A. Skin, kidney and pancreas
B. Stomach, spleen and colon
C. Small intestine, spleen and liver
D. Liver, colon and ileum

21. The rapid elongation of epicotyl during germination of seeds causes
A. cotyledons to appear above ground.
B. delay in emergence of leaves.
C. cotyledons to remain below ground.
D. rapid emergence of leaves.

22. Primary growth in plants causes increase in
A. number of branches.
B. thickness of the xylem.
C. height of the plant.
D. thickness of phloem.

23. Weak bones and teeth in children is due to lack of vitamin
A. C
B. D
C. A
D. K

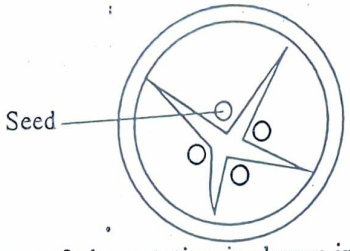
24. Which of these colours would be observed if clean saliva is tested using Biuret test?
A. Purple
B. Colourless
C. Black
D. Blue

Stunted growth, chlorosis and curling of leaves are deficiency symptoms of

A. Sulphur
B. Magnesium
C. Zink
D. Calcium

26. The figure I below shows the cross-section through a fruit.

Fig. 1



What is the type of placentation is shown in the diagram?

A. Free central
B. Axile
C. Basal
D. Parietal

27. Albinism is caused by having a double recessive gene for skin pigmentation. What is the proportion of the children having normal skin colour if an albino woman maries a man who is heterozygous for albinism?

A. 100%
B. 75%
C. 50%
D. 25%

28. A transplanted seedling recovers more quickly in darkness than in light when watered because

A. up take of water is faster in dark than in light.
B. growth is stimulated in darkness.
C. respiration is faster in dark than in light.
D. stomata are open in light than in darkness.

29. Lichens are usually the first plants to colonize a rocky surface because they

A. possess strong roots.
B. require little water.
C. are resistant to desiccation.
D. are able to photosynthesize.

30. Which of these organisms can reproduce both sexually and asexually?

A. Spirogyra
B. Amoeba
C. Bacteria
D. Yeast

(c) Using the graph, briefly describe the effect of hot water treatment on the seeds of these plants. (4 marks)

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(d) Explain the difference in the germination success between seeds soaked in hot water and those NOT soaked up to 8 minutes. (4 marks)

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(e) Explain why there was no germination of seeds soaked for 9 to 10 minutes. (2 marks)

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32. Three different plants from the same species have different leaf shapes. Plant D has spear shaped leaves, E has round leaves and plant F has oval leaves. Plant D and E are homozygous for leaf shape and plant F is heterozygous. The leaf shape is controlled by two alleles.

(a) (i) Explain the cause of the different leaf shapes in the three plants of the same species (1 mark)

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(ii) Construct a genetic diagram to show how a particular cross will always result in all offspring's having a different phenotype from both parents. ($4^1/_2$ marks)

(b) (i) In some cases when two plants shown above are crossed the off springs produced had three different shapes in the ratio of 1:2:1. Construct a genetic diagram to show how this happens. (3½ marks)

(ii) State the genotype of the heterozygous plant. (1mark)

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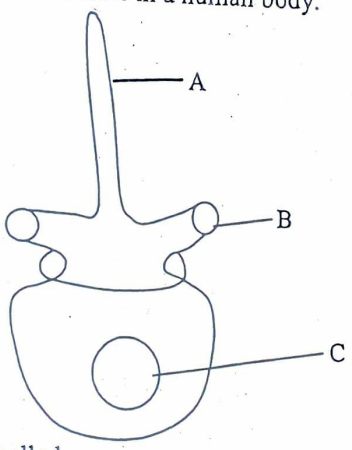
33. The figure 2 below shows a vertebrate in a human body.

Fig. 2



(a) Name the parts labelled (3 marks)

A. .....

B. .....

C. .....

(b) Identify the vertebra (1 mark)

.....

(c) In which region of the human body is the vertebra found? (1 mark)

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(d) How is the structure of the vertebra above related to its function (4 marks)

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(e) Name the vertebra posterior to one shown in the figure above. (1mark)

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SECTION C

Answer any two questions from this section.

Answers to these questions **must** be written in the answer booklets/sheets provided.

34. (a) Explain what makes gaseous exchange possible at the alveolar surface in humans. (4 marks)

(b) Describe how gaseous exchange occurs at the alveolar surface in humans. (6 marks)

(c) (i) What are the physical changes that occur to air during gaseous exchange? (4 marks)

(ii) State one importance of gaseous exchange to a human being. (1 mark)

35. A boy hears a gun short gets scared and runs away.

Describe the structural and physiological changes in his body which enable him to run away. (15 marks)

36. (a) State the differences between blood circulation of fish and man. (5 marks)

(b) How are the blood vessels carrying blood.

(i) to lungs (4 marks)

(ii) from lungs (4 marks)

adapted to their functions.

(c) How are two blood vessels in (b) above similar structurally? (2 marks)

37. (a) What is transpiration? (2 marks)

(b) In which ways is transpiration of necessity to plants? (4 marks)

(c) Describe an experiment to show that a plant shoot transpires. (9 marks)

END