

NAME..... SIGNATURE.....

553/1
BIOLOGY
(Theory)
Paper 1
July/August,2023
2 hours 30 minutes



TESO SECONDARY SCHOOLS MOCK EXAMINATION ASSOCIATION
(TESSMEA)

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 section **A** and **B** including any two questions from section **C**.

Any additional questions answered will not be marked.

Answers to section **A** should be written in the table provided.

Answers to section **B** should be written in the spaces provided.

Answers to section **C** should be written in the answer sheets.

FOR EXAMINER'S USE ONLY			
A	Marks	Examiner's initials and No.	
No. 31			
No.32			
No.33			
No.			
No.			
TOTAL			

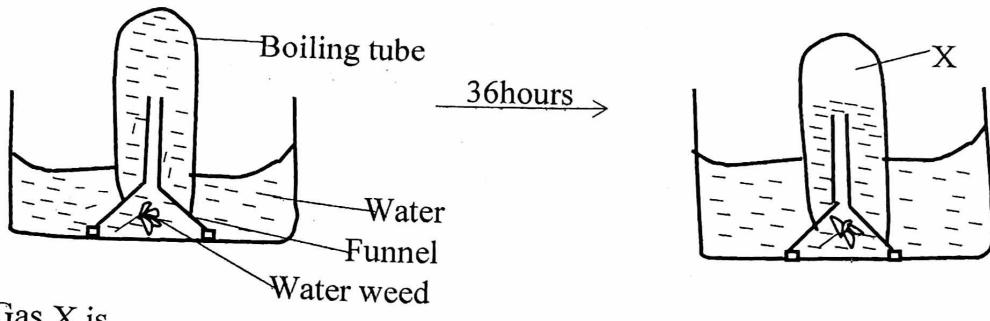
SECTION A

Answer all questions in this section

1. Which one of the following food chains consists of insects only as consumers?

- A. Grass → grasshopper → praying mantis → spider
- B. Grass → grasshopper → termites → black ant
- C. Grass → caterpillar → sparrow → spider
- D. Grass → praying mantis → grasshopper → spider

2. The set up below was placed in a warm dark room for 36hours and had the observation below.



Gas X is....

- A. Nitrogen
- B. Oxygen
- C. Carbon dioxide
- D. Water vapour

3. Which one of the following parts of a sperm contain enzymes that dissolve the vitelline membrane of an ovum.

- A. Nucleus
- B. Middle piece
- C. mitochondria
- D. Acrosome

4. The magnification of a specimen to clear visibility is X1000. What was power of objective lens used if the eye piece is X5.

- A. X 200
- B. X 5000
- C. X 1005
- D. X 500

5. An extract flowing from the cut stylet of an Amphid feeding on dicotyledonous plant was tested. Which one of the following food tested positive?

- A. Glucose
- B. Proteins
- C. Starch
- D. Sucrose

6. Which one of the following is both endocrine and exocrine in function?

- A. Pancrease
- B. Adrenal
- C. Testis
- D. Thymus

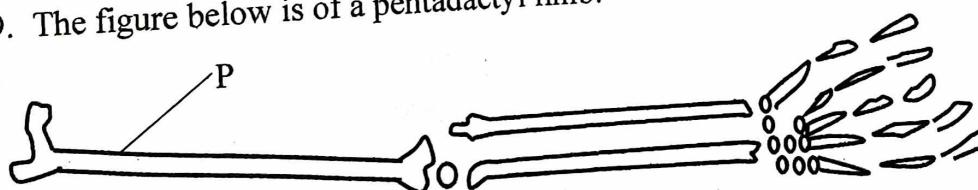
7. Of the following methods of temperature regulation, which one is physiological?

- A. Thick fur layer
- B. Scanty hair
- C. Moving to shade when hot
- D. Contraction of pili muscle

8. Which one of the following is correct order of stages in mitosis

- A. Interphase, prophase, metaphase, telophase
- B. Prophase, Anaphase, prophase, telophase
- C. Interphase, metaphase, prophase, telophase.

9. The figure below is of a pentadactyl limb.



The part labelled P is.....

- A. Femur
- B. Humerus
- C. Tibia
- D. Fibular

10. In a choice chamber the amoeba were seen moving from light to the dark region. This means the amoeba is..

- A. Negatively phototrophic
- B. Negatively phototactic
- C. Positively phototrophic
- D. Positively phototactic

11. A heart patient died of heart failure because one of the blood vessels of the heart had been blocked by blood clot. Which one of the following vessels is likely to have been blocked?

- A. Pulmonary artery
- B. Vena cava
- C. Coronary artery
- D. Pulmonary vein

12. Which one of the following is false about compensation point in plants?

- A. The plant neither gives out nor absorbs oxygen from atmosphere
- B. The plant neither gives out nor absorbs carbondioxide from atmosphere
- C. Rate of respiration equals rate of photosynthesis
- D. Plants produce more oxygen than carbondioxide to the atmosphere

13. The type of feeding in an amoeba is called

- A. Pinocytosis
- B. Saprophytism
- C. Putrification
- D. Phagocytosis

14. Which one of the following pairs of plant structures are related in function?

- A. Epidermis and phloem
- B. Xylem and root tip cells
- C. Cambium and root tip cells
- D. Cambium and epidermis

15. Which one of the following characteristics is specific of kingdom Monera? They have

- A. Cell wall made of cellulose
- B. Mega and micro-nuclei
- C. Cilia on their cell walls for locomotion
- D. Nucleolus with no nuclear membrane

16. Which one of the following is the correct pattern by which insect legs are moved when walking. The.....are lifted to move in next stage.

- A. Front left, mid right, and hind left legs
- B. Front left, mid right and hind right legs
- C. Front left, mid left and hind right legs
- D. Front left, mid left and hind left legs.

17. The neurone with its cell body in between a dendrone and axon is

- A. Sensory neurone
- B. Motor neurone
- C. Relay neurone
- D. Vagus neurone

18. The type of reproduction undergone by spirogyra during favourable condition is called.

- A. Sporulation
- B. Fragmentation
- C. Conjugation
- D. Binary fission

19. Which one of the following is not a respiratory surface?

- A. Buccal cavity of fish
- B. Skin of a frog
- C. Alveolus in mammals
- D. Tracheoles of insects

20. A cross between red and white flowers produced F₁ that were all pink. How many red flowers will be produced if the pink flowers were crossed to produce 1000 plants.

- A. 750
- B. 250
- C. 500
- D. 1000

21. Which one of the following plant parts is made of dead cells?

- A. Phloem
- B. Companion cell
- C. Cambium
- D. Xylem

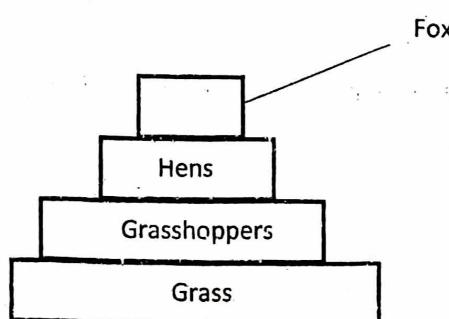
22. Which one of the following characteristics is least important in classification of leaves?

- A. Nature of leaf stalk
- B. Colour of leaves
- C. Nature of margin
- D. Roughness of lamina

23. Which one of the following is the number of chromosomes in a human sperm cell.

- A. 23
- B. 02
- C. 46
- D. 92

24. Below is a pyramid of numbers



Which of the following would be the effect on the ecosystem if hens were removed?

- A. Foxes will increase in number
- B. Grasshoppers will reduce in population
- C. Grass will be heavily fed on
- D. Grass will increase in population

25. Which one of the following organisms has extracellular digestion of food.

- A. Rhizopus
- B. Spirogyra
- C. Euglena
- D. Amoeba

26. Which one of these hormones trigger ovulation when produced?

- A. Oestrogen
- B. Luteinizing
- C. Progesterone
- D. Follicle stimulating

27. In a dicotyledonous seed germination, the.....part of the seed grows out of soil first.

- A. Epicotyl
- B. Foliage leaves
- C. Hypocotyl
- D. Root cap

28. When.....is oxidized, it produces the largest amount of energy because it has.....

- A. Starch → more carbon
- B. Proteins → plenty of hydrogen
- C. Lipid → more hydrogen
- D. Vitamins → more carbon

29. The part of the human brain that co-ordinates reflex action is

- A. Cerebrum
- B. Pituitary gland
- C. Hypothalamus
- D. Cerebellum

30. Which one of the following methods is suitable for estimating population of butterflies in an ecosystem.

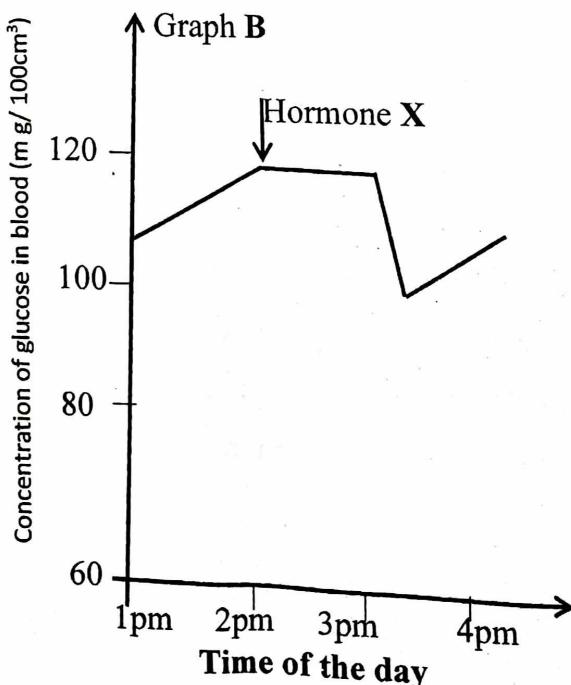
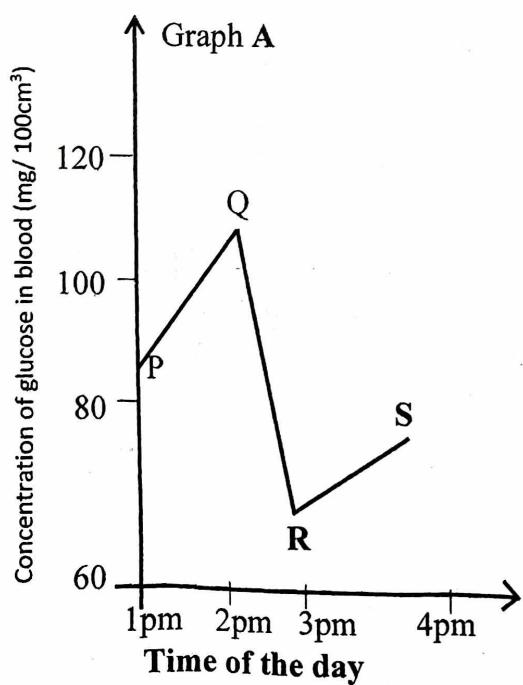
- A. Capture-mark-recapture
- B. Quadrant method
- C. Transect method
- D. Aerial photography

SECTION B (40MARKS)

Answer all questions in this section.

All answers must be written in the spaces provided.

31. Graph A shows the changes in the blood glucose of non-diabetic person after a meal while graph B shows the effect of injecting one unit of a certain hormone X in a diabetic person on the concentration of glucose in the blood measured at regular intervals. Study the two graphs and answer the following questions.



(a) Explain the shape of the graph A between points;

(i) P and Q

(02marks)

(ii) Q and R

(02marks)

(iii) R and S

(02marks)

(b) Suggest the name of the hormone X.

(01mark)

(c) Explain the shape of the graph B between;

(i) 2:30pm to 3pm after injecting hormone X.

(02marks)

(ii) 3:00pm and 3:30pm

(02marks)

(iii) 3:30pm and 4:00pm

(02marks)

(d)(i) Name the organ from which hormone X was extracted. (01mark)

(ii) What would happen to an individual whose organ you named above in d(i) above was defective and would not produce hormone X? (02marks)

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(iii) Name one other hormone which is produced by the organ you named above in d(i) above and describe its effect on carbohydrate metabolism. (02marks)

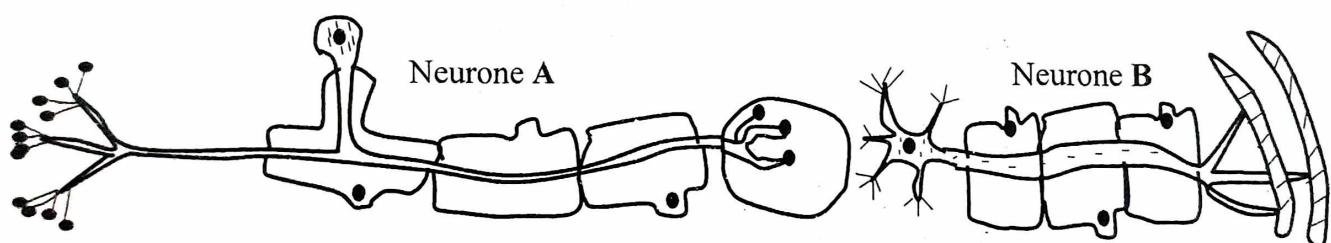
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(e) Briefly explain the effects of the extremes of glucose levels in blood.

(02marks)

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32. Figure below shows different neurons.



(a) (i) Identify the type of neuron; (02marks)

A.....

B.....

(ii) State three structural differences between neuron A and neuron B (03marks)

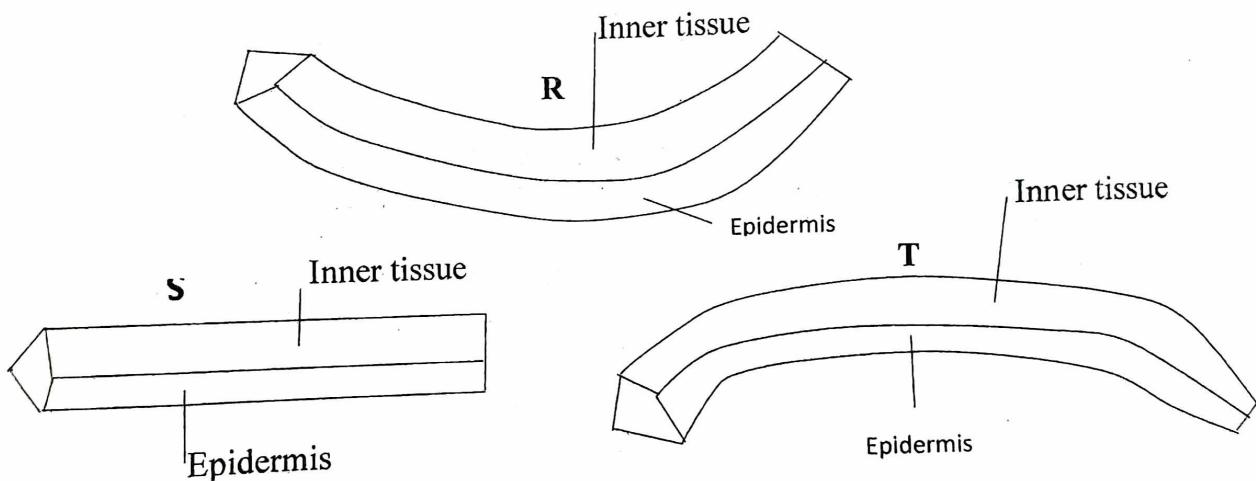
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(b) A bare footed student steps on a sharp nail and jumps away in pain.

(i) Give the name of this action (01mark)

(ii) Describe the process that resulted into student's action in (b) above. (04marks)

33. Equal pieces of leaf stalks were cut to 6cm in length. They were split longitudinally into two halves. Three pieces of the cut leaf stalks were placed in each of the three petri dishes. Different concentrations of sugar solutions were put into each of the petri dishes and the petri dishes were covered for 15 minutes. Afterwards the leaf stalks were removed from the petri dishes and their appearance was as shown below.



(a) Identify the strength of the sugar solutions in the petri dishes, in comparison to the fluid in the plant tissues in R, S and T. (03marks)

R.....

S.....

T.....

(b) Explain why it was necessary to cover all the three petri-dishes during the experiment. (01mark)

.....

.....

(c) Explain the difference between the results observed in the stalks in R and T. (06marks)

SECTION C (30 MARKS)

Answer **two** questions only.

Answers **must** be written in the **spaces** provided

34.(a) Define the terms

- (i) Endotherms (02marks)
- (ii) Osmoregulation (02marks)

(b) State four ways in which endotherms physiologically respond to high environmental temperature. (04marks)

(c) How is the water balance maintained in mammals (07marks)

35. (a) Describe the digestion of a meal of a fried cassava and milk tea in the alimentary canal.

(10marks)

(b) How are the end products of the meal utilized by the body? (05marks)

36. (a) Define the term;

- (i) recessive allele
- (ii) incomplete dominance (04marks)

(b) The petal colour of the moon flower is controlled by a single pair of alleles. In a breeding exercise a pure red and pure white-coloured plants were crossed and yielded only pink flowers. Using suitable genetic symbols show the formation of the,

- (i) Pink flowers (05marks)
 - (ii) Why were there no red or white flowers? (02marks)
- (c)(i) Using a genetic diagram, show the phenotypic and genotypic ratios of the F₂ generation. (04marks)

37. (a) Describe inhalation and exhalation in a bony fish. (11marks)

(b) How is the respiratory surface in fish adapted for its function? (04marks)

END