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

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

553/1
BIOLOGY
(Theory)
PAPER 1
July/August 2023
$2^{1}/_{2}$hours

WAKISSHA JOINT MOCK EXAMINATIONS

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 of each question.*
- *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			

Turn Over

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. The major problem faced by land organisms with lungs is that:
   A. oxygen diffuses very slowly in the air.
   B. gaseous exchange involves water loss.
   C. they use a lot of energy to breathe.
   D. lungs are located deep in the body increasing diffusion distance.

2. Which one of the following trophic levels has the least amount of energy?
   A. Producer
   B. Secondary consumer
   C. Primary Consumer
   D. Tertiary consumer

3. Water logged soils have
   A. large air spaces.
   B. large soil particles.
   C. small soil particles.
   D. low capillarity.

4. Which one of the following methods allow a mammal to lose heat?
   A. Relaxaction of erector pilli muscles.
   B. Contraction of arterioles.
   C. Development of goose pimples.
   D. Closing of jaws for a long time.

5. Which one of the following sets of bones form a joint allowing a person to squat?
   A. Humerus, tibia and radius.
   B. Femur, tibia and radius.
   C. Humerus, tibula and radius.
   D. Femur, tibia and fibula.

6. Which one of these shows a correct crop rotation?
   A. Maize, millet, sorghum and beans.
   B. Beans, groundnuts, cassava and pasture.
   C. Maize, ground nuts, cassava and pasture.
   D. Pasture, cassava, Potatoes and Yams.

7. Tendons join
   A. bone to muscle.
   B. muscle to Bone.
   C. bone to bone.
   D. bone to cartilage.

8. Blood enters the heart through vena cava and pulmonary vein, which of the following paths does the blood follow after entry?
   A. Right auricle to right ventricle.
   B. Left auricle to right ventricle.
   C. Right auricle to left ventricle.
   D. Right auricle to left auricle.

9. Which name is given to plants which during their first year, produce roots and shoots and store food material to be used during the second year for rapid growth?
   A. Perennials
   B. Biennials
   C. Annuals
   D. Deciduous

10. A daily meal accompanied with orange and lemon juice would prevent
A. Rickets.
B. Anaemia.
C. Beriberi.
D. Scurvy.

11. Which one of the following characteristics allows insects to live in dry habitats?
A. Spiracles
B. Hairy bodies
C. Wings
D. Waxy bodies

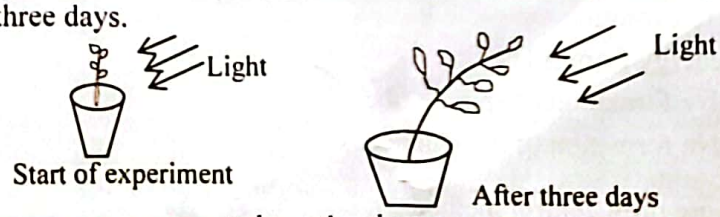
12. The scent from a flower spreads throughout a very big room. How does this scent spread?
A. By diffusion
B. By conduction
C. By Osmosis
D. By transpiration

13. Rats feed on rice and cats feed on rats. What would cause the highest increase in number of rats?
A. Less rice and few cats.
B. More rice and less cats.
C. Less rice and more cats.
D. More rice and more cats.

14. Which one of these processes is an example of development?
A. Cell absorbing water and increasing in size.
B. A cell dividing by mitosis.
C. A root tip cell becoming a phloem cell.
D. A sperm cell fertilizing an egg-cell.

15. What is the role of yeast in bread making?
A. For aerobic respiration to produce alcohol.
B. For aerobic respiration to produce carbon dioxide.
C. For anaerobic respiration to produce alcohol.
D. For anaerobic respiration to produce carbon dioxide.

16. The drawings below show a plant shoot at the start of an experiment, and the same plant after three days.



All the life process are correct about the above except.
A. Movement
B. Growth
C. Excretion
D. Sensitivity

17. Which one of the following is the best function of a companion cell in vascular tissues of plants?
A. Absorb water and dissolve minerals for the plants.
B. Transport food materials in the plant.
C. Responsible for formation of lateral roots in plants.
D. Provide the necessary energy for transportation of food.

18. Which part of the eye contain blood vessels that do supply oxygen and nutrients and remove metabolic wastes from the eye?
A. Choroid
B. Retina
C. Ciliary body
D. Cornea

19. In human reproduction, which of the following sequence of events is correct?
A. Menstruation → Ovulation → implantation → fertilization
B. Menstruation → Ovulation → fertilization → implantation
C. Ovulation → Menstruation → fertilization → implantation
D. Ovulation → Menstruation → implantation → fertilization

20. Which of these two characteristics show discontinuous variation?
A. Height and weight.
B. Eye color and Height.
C. Tongue rolling and eye color.
D. Blood groups and height.

21. Which one of the following structures of a neuron connect with other neurons?
A. Cell body
B. Axoplasm
C. Long distance
D. Dendrites

22. The structures in the human male reproductive system that are responsible for secretion of the alkaline milky fluid that neutralizes acidity of the vagina is the
A. Cowper's gland
B. Epididymis
C. Prostate gland
D. Testis

23. The following are the similarities between mitosis and meiosis EXCEPT
A. Both lead to evolution.
B. Both use energy from ATP.
C. Both involve formation of spindle fibers.
D. Both involve formation of daughter cells.

24. The following are birth control methods
(i) Vasectomy
(ii) Tubal ligation
(iii) Intra uterine device
(iv) Spermicide

Which of the methods are irreversible once applied?

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

25. Which of the following activities can take place together during temperature regulation.

A. Vasodilation. increase in sweating. contraction of erector pili muscles.
B. Vasodilation. increase in sweating. shivering.
C. Vasodilation. increase in sweating. relaxation of erector pili muscles.
D. Vasodilation. increase in sweating. shivering.

26. Which one of the following conditions would cause the adrenal gland of man to produce a hormone?

A. Hearing a song.
B. Smelling a flower scent.
C. Eating a carrot.
D. Seeing a burglar.

27. A cube which measures 2 cm has an area of 24 cm^2. its surface area to volume ratio is:-

A. 2 : 1
B. 4 : 1
C. 1 : 12
D. 3 : 1

28. Which of the following substance is present in lower concentration in renal artery than renal vein?

A. Amino acid
B. Glucose
C. Carbon dioxide
D. Urea

29. The opening of stomata during night and closure during day is an attempt to

A. stop gaseous exchange.
B. conserve water.
C. conserve energy.
D. lower the atmosphere.

30. Which one of the four seeds would provide greatest quality and quantity of nutrients for the growth of a fetus in an expectant mother?

A. Beans
B. Maize
C. Rice
D. Castor oil

SECTION B

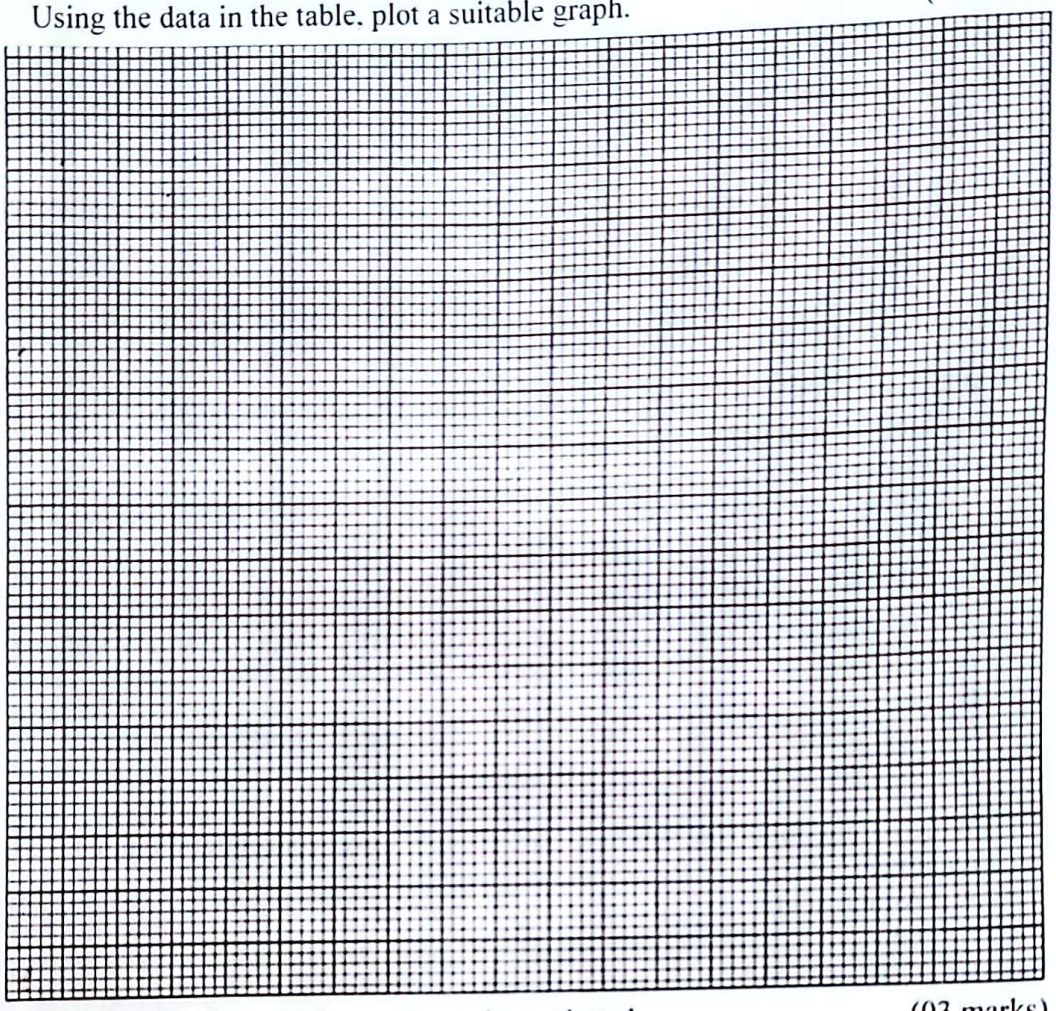
Answer **all** questions in this section.

All answers **must** be written in the spaces provided.

31. In an experiment the effect of oxygen concentration on the absorption of sodium ions by a plant was studied and the following results were obtained.

Concentration of sodium ions (arbitrary units)	8	30	50	61	65	65
Concentration of oxygen in culture solution (%)	0	10	20	30	40	50

a) Using the data in the table, plot a suitable graph. (06 marks)



b) Describe the shape of the graph you have plotted. (03 marks)

c) Explain the effect of oxygen concentrations on the absorption of sodium ions by the plant. (07 marks)

d) State **one** other factor that may increase the absorption of sodium ions. **(01 mark)**

e) Name the physiological process that was responsible for the absorption of sodium ions by the plant. (01 mark)

_____

f) Name **two** areas in the human body where the physiological process named above is applied. (02 marks)

_____

_____

32. A class of students carried out an experiment to investigate the percentage of air in three types of soils. The class results are summarized in the table below.
Study the table carefully and answer the questions that follow.

Type of soil	Percentage of air by volume
Soil A	20
Soil B	06
Soil C	13

a) If all the three soil types were mixed in equal amounts, without losing any of their contents, what would be the average percentage of air of the soils? Show your working in the space below. (01 mark)

_____

_____

b) Using the information in the table above, identify the soil types giving a reason in each case. (06 marks)

Soil type A _____

Reason

_____

_____

Soil type B _____

Reason

_____

_____

Soil type C _____

Reason

_____

_____

c) Giving a reason, state which of the soil types A, B and C drains fastest? (01 mark)

_____

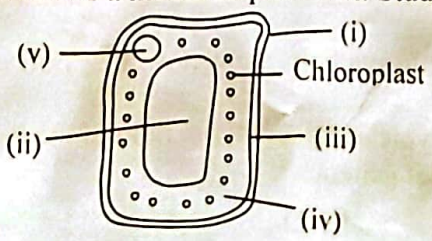
_____

d) With a reason state the types of soil which is most suitable for rice growing? (02 marks)

_____

_____

33. The figure below shows a modified plant cell. Study it and answer the questions that follow.



a) Name the parts labeled (i) to (iv) (02 marks)

(i) _____

(ii) _____

(iii) _____

(iv) _____

b) Name the layer in the leaf from which the cell could be obtained. (01 mark)

_____

c) State how **two** observable features on the above structure adapt a leaf for photosynthesis? (04 marks)

_____

_____

_____

_____

d) Why is it advisable for an athlete to double his carbohydrate intake two weeks before the race? (03 marks)

_____

_____

_____

SECTION C (30 marks)

Answer any **two** questions from this section.
Answers to these questions **must** be written in the answer booklets/sheets provided.

34. a) Describe how the structure of the respiratory system in man is suited for movement of air along it. (06 marks)

b) Outline the mechanism of ventilation in man. (09 marks)

35. a) (i) Explain the difference between Hypogeal and Epigeal germination. (04 marks)

(ii) State the conditions necessary for germination to take place. (03 marks)

b) Explain the series of events that lead to germination of a maize seed. (08 marks)

36. a) What is soil degradation? (01 mark)

b) Explain how the following human activities degrade soil.

(i) Deforestation. (02 marks)

(ii) Over application of inorganic fertilizers. (02 marks)

c) How can man conserve soil on a flat bare land? (05 marks)

d) Explain the effects of soil erosion. (05 marks)

37. a) What is meant by an allele? (01 mark)

b) In a breeding experiment, a round pea seed shaped plant was crossed with a wrinkled pea seed shaped plant and all the first filial generation were round seed shaped plants.

i) Using suitable genetic symbols, show how the F_1 off springs were obtained. (05 marks)

ii) Work out the genotypic and phenotypic ratio of the F_2. (06 marks)

c) State **three** applications of genetics. (03 marks)

END