Candidate's name ……..……

Index number ……... Signature ……..……..……...

553/1
BIOLOGY
(Theory)
Paper 1
July/Aug. 2022
2½ hours

PRE-END OF CYCLE ASSESSMENT

Uganda Certificate of Education

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* **C**.

Write the answers to section **A** *in the boxes provided, answers to section* **B** *in the space provided, and answers to section* **C** *in the answer booklets provided.*

For Examiners' Use Only			
Section		**Marks**	**Examiner's Sign.**
A:	**1 – 30**		
B:	**No. 31**		
	No. 32		
	No. 33		
C:	**No.**		
	No.		
TOTAL			

 Turn Over

SECTION A (30 MARKS)

Answer **all** *questions in this section. Write the letter representing the correct answer to each question in the boxes provided.*

1. Six fingers in man is controlled by a sex linked recessive gene located on X chromosome. If a normal woman marries a six fingered man, which of the children will have six fingers?

A. All sons

B. All daughters

C. All will be normal

D. Half the number of boys and girls will be normal

2. Which of the following glands becomes most active when a person is frightened?

A. Thyroid gland

B. Pancreas

C. Adrenal gland

D. Gonads

3. Which of the following conditions does not favour cross pollination in flowers?

A. Bisexualism

B. Self sterility

C. Dioeciousness

D. Protandry

4. Which of the following animals has a higher metabolic rate than the rest?

A. Cat

B. Dog

C. Giraffe

D. Elephant

5. Which of the following is a tactic response?

A. Bending of plant roots towards gravity

B. Folding of leaves of mimosa pudica

C. Twisting of tendrils around support

D. Movement of wood larvae from light

6. Tendency of the fish to swim side to side during swimming is known as;

A. Rolling

B. Pitching

C. Yawing

D. Turbulence

7. Plants do not need special excretory organs because they;

A. Eliminate their wastes instantly

B. Produce only gaseous wastes

C. Produce less toxic wastes slowly

D. Do not produce wastes

8. Which one of the following changes occurs in the eye when a person reading a book looks up view an aeroplane flying in the sky?

A. The ciliary muscle relaxes

B. The radial muscles of the iris contract

C. The lens becomes thick

D. The pupils become smaller

9. Which of the following statements is true of a person who lives at sea level compared to one who lives at high altitude? The one at sea level-

A. Breathes more slowly when both are at high altitude

B. Has more blood vessels

C. Breathes faster when both are at high altitude

D. Has more red blood cells

10. In plants efficient gaseous exchange due to large surface area to volume ratio is achieved by –

A. Numerous stomata on leaves

B. Flatness of leaves

C. Large sized lenticels

D. Numerous root hairs

11. Which of the following contains a set of cells which are all haploid?

A. Pollen grains, ovules and root hair cells

B. Sperms, pollen grains and ova

C. Sperms, ovules and brain cells

D. Cells of epididymis, ovules and ova

12. Which of the following statements describes epigeal germination?

A. Hypocotyls elongates, leaving cotyledons below ground

B. Epicotyls elongates, leaving cotyledons below ground

C. Hypocotyls elongates bringing cotyledons above the ground

D. Epicotyls elongates, bringing cotyledons above ground

13. The part of the brain which controls involuntary reactions is-

A. Cerebrum

B. Cerebellum

C. Medulla oblongata

D. Hypothalamus

14. Which of the following variations in humans is different from the rest?

A. Sex

B. ABO blood grouping

C. Eye colour

D. Tongue rolling

15. Which of the following effects is caused by over secretion of thyroxine hormone in humans?

A. Cretinism

B. Gain of body weight

C. Reduced metabolic rate

D. Loss of body weight

16. Which of the following is a conditioned reflex?

A. Knee jerk on striking the tendon below knee cap

B. Constriction of the pupil on shining bright light into one's eye

C. Salivating on tasting good food

D. Salivating at the sound of dinner bell

17. A dry fruit which splits transversely along several points is –

A. Follicle

B. Lomentum

C. Legume

D. Capsule

18. Which one of the following activities results into upstroke during flight in birds?

A. Contraction of large flight muscles and relaxation of small flight muscles

B. Contraction of small flight muscles and relaxation of large flight muscles

C. Movement of humerous downwards

D. Faster air movement on upper surface than lower surface of wings

19. In which part of the kidney nephron does reabsorption of chloride ions take place?

A. Proximal convoluted tubule

B. Distal convoluted tubule

C. Collecting duct

D. Loop of Henle

20. While analysing a soil sample, the following results were obtained:

Sand = $200cm^3$

Water = $300cm^3$

Water + sand after stirring = $450cm^3$

What was the percentage of air in sand?

A. 30%

B. 25%

C. 20%

D. 10%

21. A farmer grew beans and noticed that the leaves turned yellow but veins remained green. The minerals likely to be deficient in the soil are:

A. Magnesium and iron

B. Potassium and manganese

C. Calcium and potassium

D. Zinc and calcium

22. When 20g of food substance was burnt completely the heat produced raised the temperature of $50cm^3$ of water from 25 to 37^oC. If the specific heat capacity of water is $4.2Jg^{-1}K^{-1}$, Determine the energy content of the food substance in Jg^{-1}

A. 2520

B. 1260

C. 252

D. 126

23. To which of the following does humus contribute least in the soil?

A. Improving aeration

B. Increasing soil fertility

C. Improving water retention

D. Reducing soil erosion

24. The disadvantage the amoeba has in using binary fusion is that

A. The process is slow

B. It occurs in aquatic environment

C. Few offsprings are produced

D. Amoeba may become less adapted to its environment

25. Removal of bark from the tree trunk interferes with the movement of –

A. Water to leaves

B. Mineral salts to leaves

C. Food to the leaves

D. Food to roots

26. Which of the following food chains is the most efficient for making energy available to human beings, assuming the same mass of green plant material to be consumed in each case?

A. Green plant → sheep → human

B. Green plant → human

C. Green plant → zooplanktons → fish → human

D. Green plant → birds → eggs → human

27. Which one of the following is the correct route taken by an impulse after it has left relay neurone?

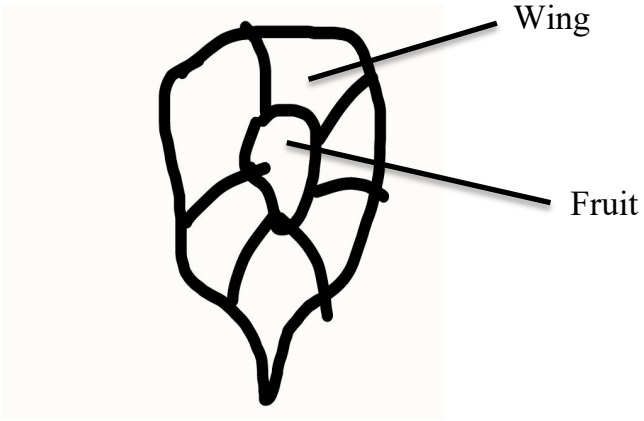
A. Synapse → sensory neurone → effector

B. Sensory neurone → synapse → effector

C. Synapse → motor neurone → effector

D. Sensory neurone → motor neurone → effector

28.



The type of fruit above is known as –

A. Caryopsis

B. Achene

C. Samara

D. Cypsella

29. Which one of the following would not contribute to the accuracy of the capture recapture method of estimating population size?

A. Using a sable population

B. Capturing animals selectively

C. Use of very small labels

D. Allowing time before recapture

30. Which of the following diseases are all transmitted by mosquitoes?

A. Yellow fever, elephantiasis, river blindness

B. Malaria, elephantiasis, river blindness

C. Denger fever, river blindness, malaria

D. Yellow fever, denger fever, elephantiasis

SECTION B (40 MARKS)

Answer **all** *questions in this section*

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

31. In an experiment leaf strips of commelina of equal sizes were placed in sucrose solutions of different concentrations. After 30 minutes strips were removed and placed in same solution. The percentage of cells which were plasmolysed in each solution was recorded as shown in the table below.

Sucrose concentration (mol/l)	0.0	0.2	0.3	0.5	0.7	0.8	0.9
Percentage plasmolysis (%)	2	5	20	70	98	100	100

(a) (i) Explain why the plant cells were plasmolysed when placed in some sucrose solutions. (*2 marks*)

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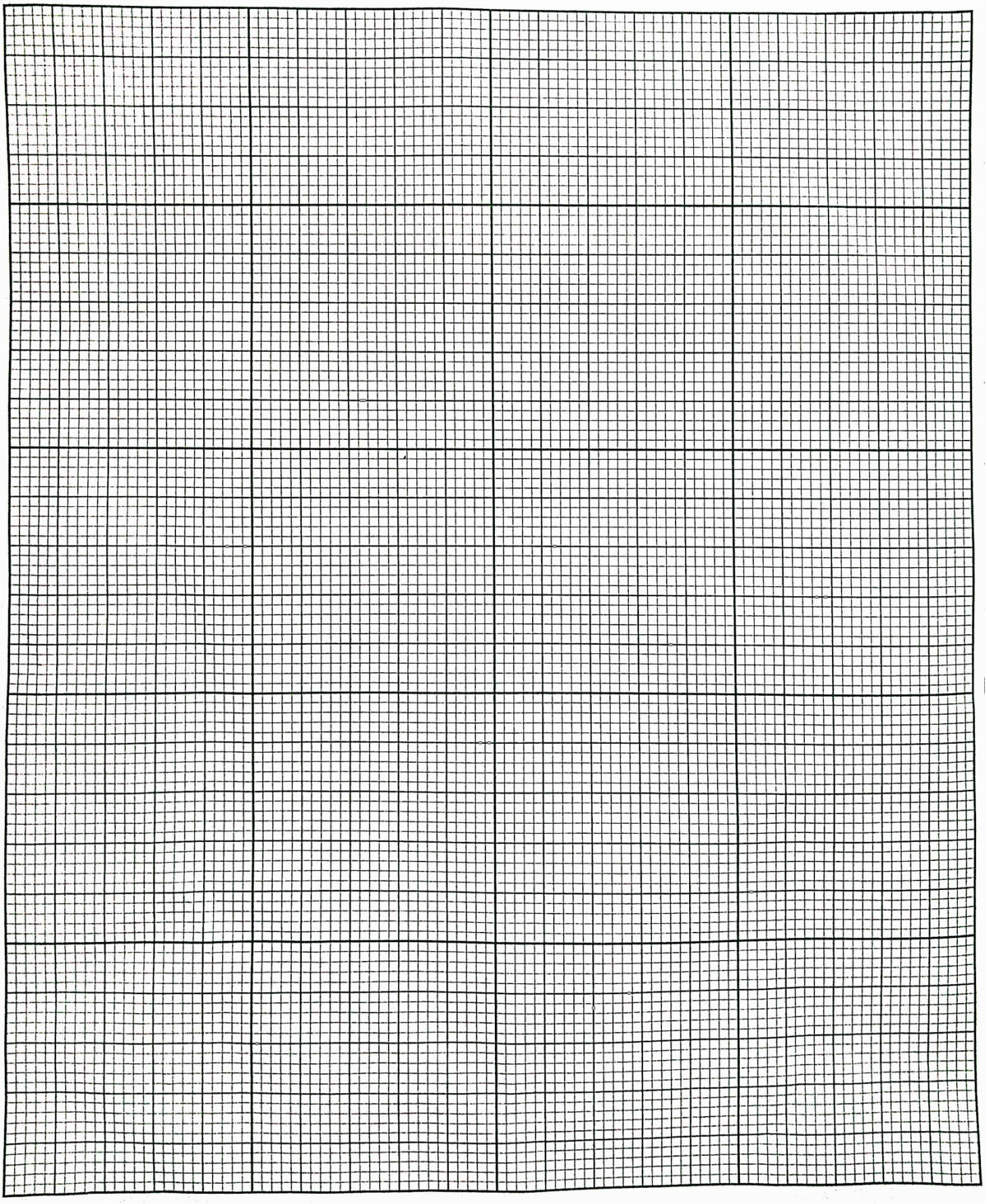
(ii) In the space provided, plot a graph to represent the information. (*6 marks*)



(iii) From the graph determine the concentration of sucrose in which plasmolysed cells were equal to unplasmolysed cells. (*½mark*)

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(b) Explain the results obtained at the following concentrations of sucrose.

(i) 0.1mol/l (*2½ marks*)

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(ii) 0.2 to 0.7mol/l (*2½ marks*)

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(iii) 0.7 – 0.9mol/l (*2½ marks*)

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(c) What would happen to red blood cells if they were placed in sucrose solution of 0.0 to 0.2 mol/litre. (*2 marks*)

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(d) Briefly explain how the commellina strips would feel when placed in 0.0 molar sucrose solution (*2 marks*)

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32. In an experiment plants with red petals were crossed together and a total of 898 offspring were obtained and of these 325 plants had white petals while the rest had red petals.

(a) With a reason identify the parental character which was recessive. (*3 marks*)

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(b) What was the genotype of the parents? (*1 mark*)

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(c) Using suitable symbols work out the expected phenotypic and genotypic ratios in the experiment. (*4 marks*)

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(d) Were the observations/ results in agreement with the laws of monohybrid inheritance? (Show your working) (*2 marks*)

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33. (a) State two advantages and disadvantages of an animal being an endotherm.

(*4 marks*)

(i) Advantages

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(ii) disadvantages

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(b) Explain how each of the following parts of the skin regulates body temperature when the environmental temperature is high.

(i) Hairs (*2 marks*)

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(ii) sweat glands (*2 marks*)

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(c) Why is it necessary to maintain constant body temperature? (*2 marks*)

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SECTION C (30 MARKS)

Answer any **two** *questions from this section. Answers to these questions* **must** *be written on the answer sheets provided. Additional question(s) answered will* **not** *be marked.*

34. (a) Explain how lungs are adapted to their function as respiratory organs. (*10 marks*)

(b) Explain why protozoans do not require a respiratory system. (*5 marks*)

35. (a) Describe an experiment to show that heat is produced by germinating seeds. (*9 marks*)

(b) Explain the importance of the following during seed germination. (*6 marks*)

(i) Oxygen/air

(ii) Suitable temperature

(iii) Light

(iv) Water

36. (a) What is meant by pollution? (*2 marks*)

(b) Explain how the continued use of polythene paper may harm the environment. (*10 marks*)

(c) Suggest ways of preventing the effects suggested in (b) (*3 marks*)

37. (a) Explain how flowers are adapted to wind pollination. (*10 marks*)

(b) What are the benefits of sexual reproduction in plants? (*5 marks*)

END