Name…….Index No……..

553/1
BIOLOGY
(Theory)
PAPER 1
July/August 2023
2½ hours

MWALIMU EXAMINATIONS BUREAU

UCE RESOURCE MOCK EXAMINATIONS – 2023

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 spaceprovided, 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			

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 C. Giraffe

   B. Dog 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. Which of the following joint allow the highest degree of movement? joints between the

   A. skull bones

   B. femur and tibia

   C. pelvis and femur

   D. vertebrae of the spine

7. Which one of the following plants is propagated by leaves?

   A. Banana

   B. Irish potato

   C. Ginger

   D. Bryophyllum

8. Which one of the following changes occurs in the eye when a person reading a book then looks up to 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 actions 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 2g of food substance was burnt completely the heat produced raised the temperature of $50cm^3$ of water from 25 to 37°C. 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. Which one of the following forms of reproduction leads to variation among offspring

A. Budding in yeast

B. Binary fission in amoeba

C. Sporulation in mucor

D. Conjugation in spirogyra

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 is 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 statements is correct when the heart muscles relax?

A. Pressure in the ventricles decreases

B. Volume in each ventricle decreases

C. Pressure in each ventricle increases

D. Blood flows out of the ventricles

28. Which one of the following hormones maintains pregnancy?

A. Follicle stimulating hormone

B. Progesterone hormone

C. Luteinizing hormone

D. Oestrogen hormone

29. Which one of the following methods can best be used to estimate the number of fish in a pond?

A. Trapping and elimination

B. Quadrat estimation

C. Direct counting

D. Capture – recapture

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

A. Yellow fever, elephantiasis, river blindness

B. Malaria, elephantiasis, river blindness

C. Dengue fever, river blindness, malaria

D. Yellow fever, dengue fever, elephantiasis

SECTION B (40 MARKS)

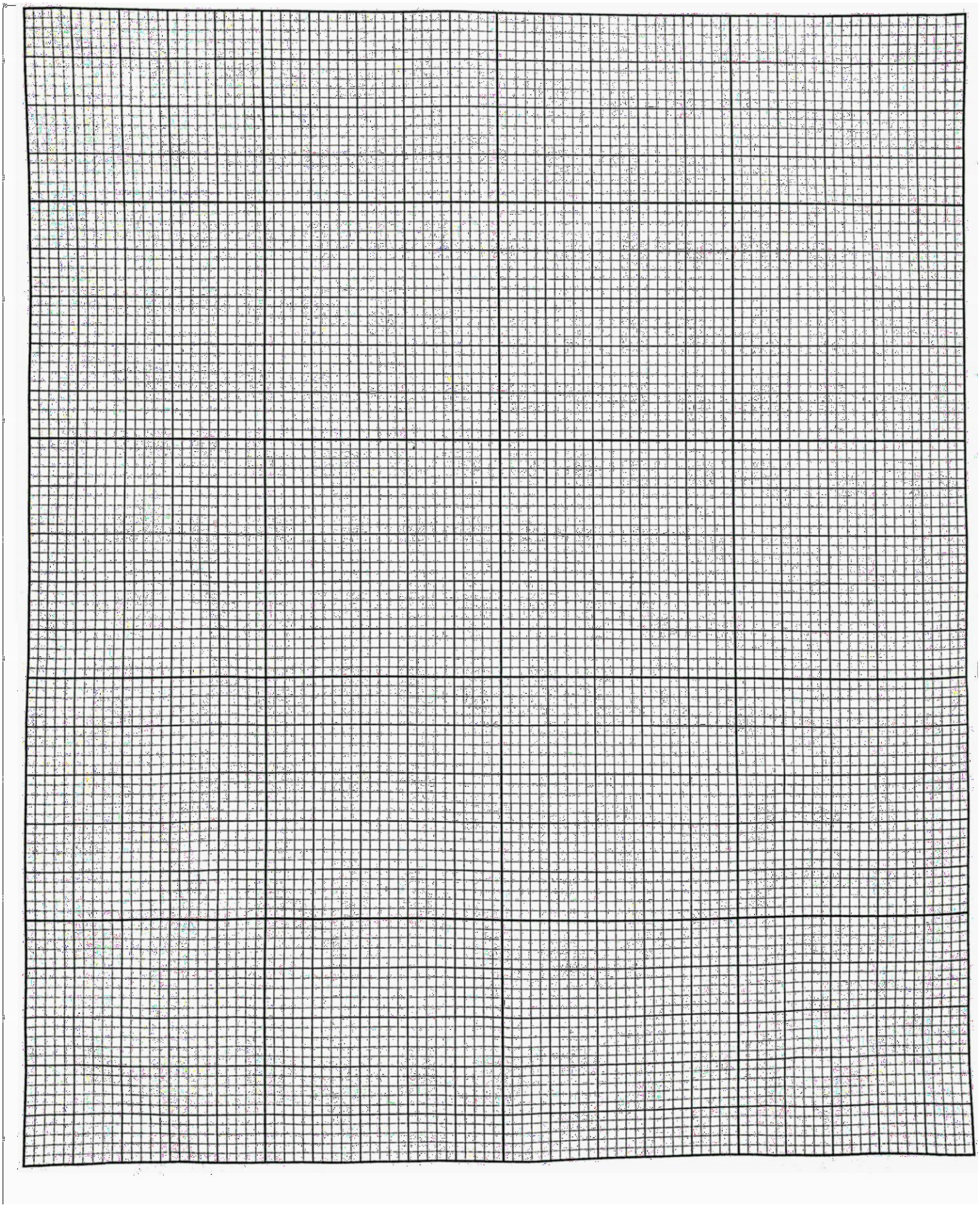
Answer **all** *questions in this section*

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

31. The table below shows the quantities of sweat and urine varying with external temperature

External temperature (^oC)	0	5	10	15	20	25	30	35
Urine (cm^3/hr)	100	90	80	70	60	50	40	30
Sweat (cm^3/hr)	5	6	10	20	30	60	120	190

a) Plot a graph to represent the above information. (08 marks)



b) i) Describe the relationship between the temperature and sweat production in the graph. (02 marks)

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ii) Explain the relationship in b (i) above. (02 marks)

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c) Explain the observation made on the amount of urine produced as the temperature increases. (03 marks)

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d) i) What is the importance of maintaining a constant internal environment? (02 marks)

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ii) How is the skin adapted for temperature regulation? (03 marks)

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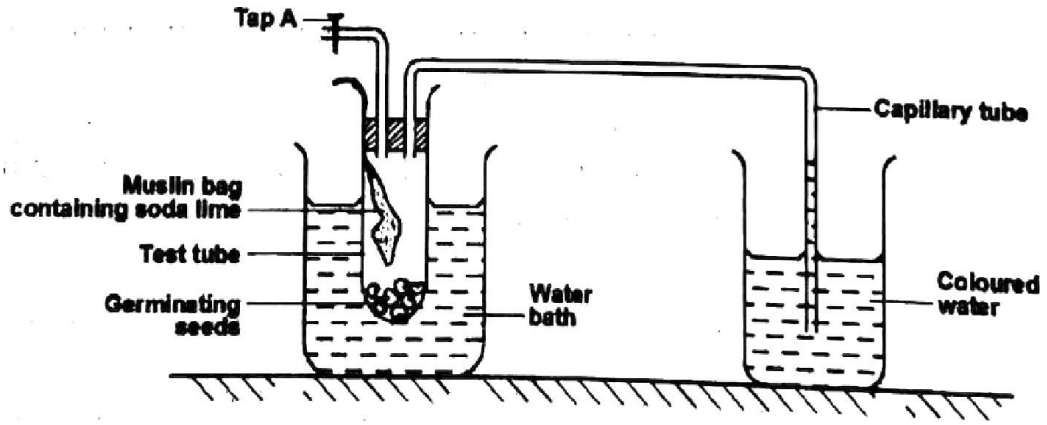
32. The experimental set up below was used in an investigation. During the investigation, tap **A** was closed after 10 minutes and the set up left to stand for 1 day. Study the figure and answer the questions that follow.



a) State the aim of the experiment in the set up above. (01 mark)

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b) Give the use of soda lime contained in the muslin bag. (01 mark)

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c) i) What is observed in the capillary tube after one day? (01 mark)

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ii) Give reasons for the observations in (c) (i) above. (03 marks)

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d) i) What would be observed in the capillary tube if there was no soda lime in the muslin bag? (01 mark)

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ii) Give a reason for the observation in (d) (i). (02 marks)

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e) What changes can be made in the experimental set up to come up with a suitable control experiment. (01mark)

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33. a) What is meant by a genotype? (01 mark)

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b) A man of blood group **A** marries a woman homozygous for blood group **B** and they produced a son of blood group **B**.

i) Work out the genotypes of the father and son. (04 marks)

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ii) The son married a wife of blood group **O**, showing your working, give the percentage of the possible phenotypes of their off springs. (04 marks)

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c) Blood groups in humans show discontinuous variation, Explain what you understand by this statement. (01 mark)

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SECTION C (Essay) – 30 marks.

Attempt any two (2) questions in this section.

34. a) How is gaseous exchange important to organisms? (02 marks)

b) Describe the ventilation mechanism, in a bony fish. (07 marks)

c) How is the respiratory surface of a bony fish adapted to is function? (03 marks)

d) Explain why protozoa like amoeba does not need a developed respiratory system. (03 marks)

35. a) What is pollution? (01 mark)

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

c) Suggest ways of preventing the effects mentioned in (b) above. (04 marks)

36. a) Outline the primary functions of roots to a plant. (02 marks)

b) Giving an example in each case, illustrate the various forms of root modifications. (10 marks)

c) Give **three (3)** internal structural differences between monocotyledonous root and dicotyledonous root. (10 marks)

37. a) Define transpiration (01 mark)

b) Outline the various ways a plant may benefit from transpiration. (04 marks)

c) Explain why the leaves of a herbaceous plant may wilt on a hot sunny day. (07 marks)

d) How are plants living in arid areas able to minimize excessive loss of water. (03 marks)

END