Name..... Centre/Index No. .....

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P530/1
BIOLOGY
PAPER 1
July/August 2024
$2^1/_2$ hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Advanced Certificate of Education
BIOLOGY
(Theory)

Paper 1

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of **40** questions in section **A** and **6** questions in section **B.**

Answer **all** questions in both sections **A** and **B**

Section A: Answers to this section must be written in the boxes provided.

Section B: Answers to this section should be written in the spaces provided and not anywhere else.
No additional sheet(s) of paper should be inserted in this booklet.

FOR EXAMINERS' USE ONLY			
SECTION		**MARKS**	**Examiners' initials & No.**
Section A:	1- 40		
Section B:	41		
	42		
	43		
	44		
	45		
	46		
TOTAL			

SECTION A (40 MARKS)

Write the letter corresponding to the **most** correct answer in the box provided on the right of each question.

1. Large amounts of un decomposed organic matter may accumulate due to
   A. Absence of decomposers.
   B. Failure to decompose lignin.
   C. Presence of little oxygen.
   D. Abundance of nutrients.

2. Cells are limited in size in order to
   A. cut down energy demands.
   B. allow effective control of nucleus.
   C. reduce the surface area.
   D. increased cell division.

3. All the following are true of a light and electron microscope except

Table 1

Light microscope	Electron microscope
A. Uses light to 'view' object	Uses electrons to 'view' objects
B. Uses glass lenses for focusing	Uses magnetic lenses for focusing
C. Specimen must be killed and strained	Specimen be alive and non-strained
D. Resolution is not as great	Resolution is greater

4. The role of light reactions in photosynthesis is to
   A. reduce carbon dioxide.
   B. reduce glycerate 3 phosphate.
   C. regenerate RUBP.
   D. form ATP.

5. An adult male with undeveloped testes is likely to suffer from
   A. Down syndrome.
   B. Klinefelter syndrome.
   C. Turner syndrome.
   D. Jacob's syndrome.

6. Which of the following is true of all epithelial tissue?
   A. lacks a basement membrane.
   B. have a rich blood supply.
   C. cells have a free surface.
   D. have cilia on their free surface.

7. Stimulation of hair cells in the semi-circular canals results from the movement of
   A. basilal membrane.
   B. Otolinths.
   C. Endolymph.
   D. aqueous humor.

8. The role of calcium ions during muscle concentration is to
   A. lower the threshold value of the muscle spindle.
   B. activate troponin to displace tropomyosin.
   C. activate actin to displace tropomyosin.
   D. break the actomyosin bridges.

9. Which of the following is true of natural immunity. It
   A. is Non- specific.
   B. has a memory.
   C. is adaptive.
   D. is acquired.

10. The distance a bird can glide in still air depends on the
   A. weight of its body.
   B. the size of its wings.
   C. shape of its wings.
   D. height it starts the glide.

11. In an endergonic reaction, the product of the reaction contains
   A. more energy than the reaction and energy is released.
   B. more energy than the reactants and energy must be supplied.
   C. less energy than the reactants and energy is released.
   D. less energy than the reactants and energy must be supplied.

12. Interconversion of phytochromes Pr to Pfr can be initiated by subjecting a plant to a
   A. flash of red light.
   B. flash of far red light.
   C. long period of darkness.
   D. short period of darkness.

13. The intensity of a sound is determined by:
   A. frequency of the sound waves.
   B. stiffness of the basilar membrane.
   C. Amplitude of the sound waves.
   D. pattern of impulses in the auditory nerve.

14. Synchronous contraction of all muscles of an earthworm is as a result of
   A. contraction of the longitudinal muscle.
   B. high transmission velocity of impulses.
   C. contraction of the circular muscle.
   D. rotation of the chaetae.

15. Plants lack a circulatory system for transporting gases yet some are large because:
   A. they have few living cells most of the plant being dead wood.
   B. they have large surface area to volume ratio.
   C. they are less metabolically active than animals.
   D. the gases would normally block xylem vessels.

16. During sex determination
   The X and Y chromosomes are only important
   A. once gonads are formed.
   B. during early stage of gonad development.
   C. when sex hormones take over.
   D. in homogametic individuals.

17. Extremities of animals in cold regions,
A. are large with a rich blood supply.
B. are large with a small blood supply.
C. are smaller with a small blood supply.
D. have poor insulation mechanism.

18. Which one of the following does **not** involve mass flow?
A. Blood flow in veins.
B. Up take of food by tape worm.
C. Movement of food in the gut.
D. Translocation in the xylem.

19. Myelinated axons of a frog conduct impulses at a lower speed than those of same diameter in a rat because the
A. myelin shealth in axons of frogs is thinner.
B. rat is endothermic.
C. neurons of a frog have more synapses.
D. frog lives in cold water.

20. The amount of energy in the producers available to the consumers is called the
A. energy budget.
B. standing crop.
C. net primary production.
D. net secondary production.

21. A polar bear has a lower lethal temperature than a kangaroo rat because of
A. better insulation mechanisms in kangaroo rat.
B. large size of the polar bear.
C. White body colour of the polar bear.
D. Better insulation mechanisms in the polar bear.

22. The main physiological mechanism employed by plants to avoid wilting is
A. production of abscisic acid.
B. rolling leaves.
C. development of thick cuticle.
D. Production of gibberellions.

23. Hydrophytes lack wax- covered leaves because
A. they need much air for respiration.
B. they do not need to conserve water.
C. the wax would make the leaves heavy and sink.
D. their leaves cannot support synthesise wax.

24. Which of the following is true of bacterial DNA?
A. Presence of telomeres.
B. Presence of linear chromosomes.
C. It is Diploid.
D. Presence of introns and exons.

25. Which of the following is most suitable for determining the commonest plant species in a large habitat?
A. Line transect.
B. Quadrat.
C. Direct count.
D. Aerial view method.

26. Following ovulation; the corpus luteum develops under the influence of
A. Luteinizing hormone.
B. Progesterone.
C. Follicle stimulating hormone.
D. Estradiol.

27. Crossing over occurs between
A. non sister chromatids of a bivalent.
B. Sister chromatids of the same chromosome.
C. two different kinds of chromosomes.
D. two different kinds of bivalents.

28. Which of these are present in all viruses?
A. Envelope, nucleic acid, capsid.
B. DNA, RNA and proteins.
C. Proteins, nucleic acids, carbohydrates and lipids.
D. Proteins and a nucleic acid.

29. The transport of products of photosynthesis as a result of turgor pressure difference is called
A. Osmotic movement.
B. Cytoplasmic.
C. Mass flow.
D. Active transport.

30. Which of the following is the true about the adjustments of the thorax during inhalation in humans?
A. The diaphragm becomes dome shape.
B. External intercostal muscles relax.
C. The rib cage moves upwards and inwards.
D. Internal intercostal muscles relax.

31. The oxidation of stearic acid in cellular respiration is represented by the equation.
$C_{17}H_{35}COOH + 26O_2 \rightarrow 18CO_2 + 18H_2O_{(2)}$
Which of the following figures represents the correct respiratory quotient of stearic acid?
A. 0.54
B. 0.69
C. 0.2
D. 0.65

32. Which of the following type of learning makes humans more superior to all other types of animals?
A. Insight learning.
B. Trial and error learning.
C. Associative learning.
D. Exploratory learning.

33. The essential products of the Krebs cycle are
A. Energy and water.
B. Carbon dioxide and water.
C. Energy and hydrogen.
D. Carbon dioxide and energy.

34. The leaves of a submerged plant are usually
A. large, thin and fragile.
B. large, thick and deep green.
C. small, yellowish – green and flattened.
D. small, thick and waxy.

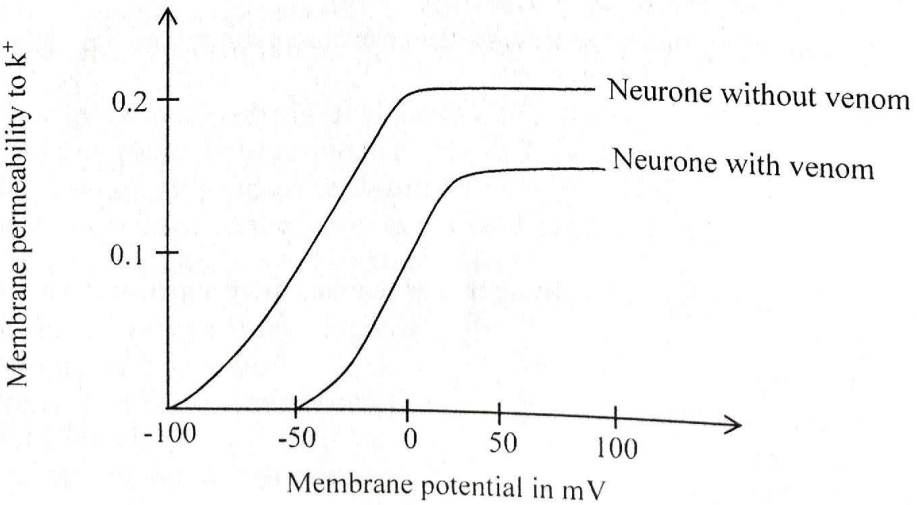
35. Which of the following component of semen provides the sperms with a source of energy?
A. Glucose.
B. Fructose.
C. Sucrose.
D. Galactose.

36. The main role of the inflammatory response is to;
A. Increase blood flow at the site of the wound to flush out invading pathogens.
B. Produce anti bodies that bind to invading cells to eliminate them.
C. Contain and eliminate foreign cells and materials at the site of infection.
D. Increase heat at the site of infection to activate enzymes used in the immune response.

37. The adaptive significance of spiracles in terrestrial insects is that they
A. open into the body cavity allowing direct contact between haemolymph and tissues.
B. they close off trachea to minimize water loss.
C. dilate and constrict during flight or other types of movement functioning as a breathing mechanism.
D. they are highly branched offering a large surface area for gas exchange.

38. Figure below shows membrane permeability to K^+ at different membrane potentials with similar nerve cells. One neuron had scorpion venom added to the surrounding medium and the other without.

Fig. 1



Which of these conclusions can you draw from the data?
A. There is more than one type of K^+ channel.
B. The venom blocks all K^+ channels.
C. The venom opens all K^+ channels.
D. The venom doesn't affect K^+ movement.

39. Which of the following substance is oxidized during photorespiration?
A. Ribulose biphosphate.
B. Phosphoglyceradehyde.
C. Chlorophyll.
D. Phosphoglyceric acid.

40. Which of the following pestcides may cause less damage in the long run?
A. Lethal but non-persistent.
B. Sub lethal and persistent.
C. Lethal but persistent.
D. Sub lethal and non- persistent.

SECTION B (60 MARKS)

41. (a) What is meant by the term infertility in humans? (02 marks)

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(b) State three causes of infertility in adult females (03 marks)

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(c) Explain why progesterone and oestrogen fluctuate during the female sexual cycle. (05 marks)

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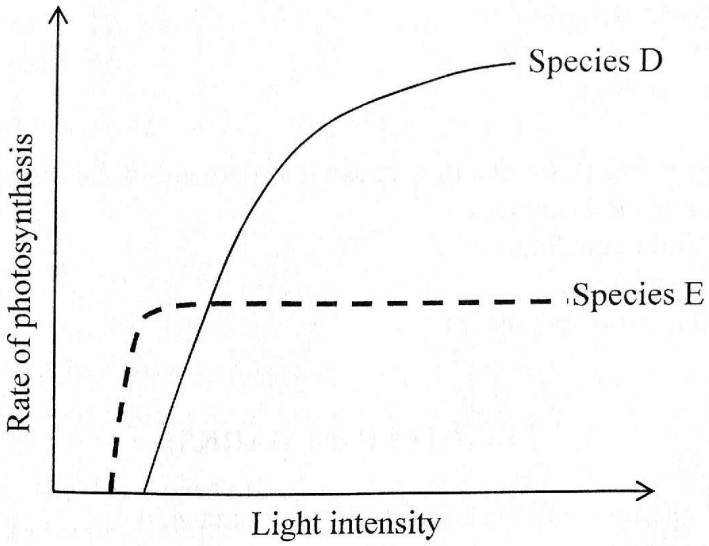
42. The rate of photosynthesis at different light intensities for two different species of plants was investigated as shown in figure 3 below. Study it carefully and answer the questions that follow.

Fig. 2



(a) Using the information in the figure above, explain of the two species of plants, D or E which one is better adapted to living in shady conditions. (03 marks)

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(b) Suggest four ways in which structure of the leaves of species D differ from those of species E (04 marks)

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(c) State three roles of light in photosynthesis. (03 marks)

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43. (a) (i) Distinguish between parasites and saprophytes. (04 marks)

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(ii) Explain why detritivores are important in the decomposition process. (04 marks)

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(b) State two other factors that affect decomposition in nature. (02 marks)

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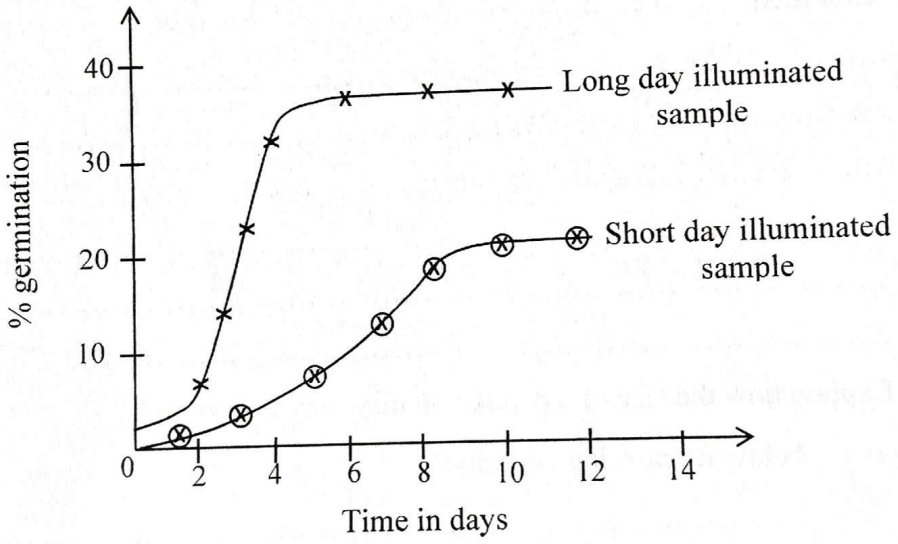
44. Figure 3 below shows the results of an experiment to demonstrate the effect of short and long day illumination on the percentage germination of seed samples from a short day plant.

Fig. 3



(a) State four differences in the effects of short and long day illumination on percentage germination of the seed samples. (04 marks)

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(b) Explain the effect of varying the illumination cycles on germination of the long day illuminated seed sample. (03 marks)

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Turn Over

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(c) State three other external factors that may influence the onset of germination of the above seed samples. (03 marks)

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45. (a) Define the term population. (03 marks)

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(b) State four factors that may cause the carrying capacity of the environment to be exceeded. (04 marks)

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(c) Explain how the size of a population may vary over time.

(i) below its carrying capacity. (02 marks)

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(ii) At its carrying capacity. (01 mark)

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46. (a) On Sesse islands are 150 species of lizards belonging to the genus Anolis. Scientists believe that these species evolved from two species found on main land Uganda. Explain how the species could have evolved. (06 marks)

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(b) Explain why bats and birds, despite not being closely related have evolved wings?
(04 marks)

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END