P530/1
BIOLOGY
Paper 1
AUGUST, 2022
2½ hours

JINJA JOINT EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

MOCK EXAMINATIONS – AUGUST, 2022

BIOLOGY

Paper 1

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

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

SECTION A:
Answers to this section must be written in the answer sheet provided at the end of this section.

SECTION B:
Answers to this section should be written in the spaces provided and not anywhere else.

No additional sheets of paper should be inserted in this booklet.

For Examiner's Use Only

SECTION		MARKS
Section A:	1 – 40	
Section B:	41	
	42	
	43	
	44	
	45	
	46	
TOTAL		

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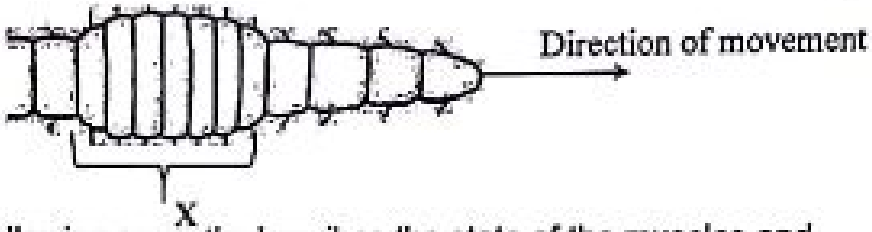
SECTION A (40MARKS)

1. Which one of the following plant tissues forms a starch sheath in plant body?
   A. Hypodermis
   B. Endodermis
   C. Pericycle
   D. Epidermis

2. Which one of the following is not a non-specific defense in the immune system of humans?
   A. Plasma cells
   B. Inflammation
   C. Phagocytic cells
   D. Secretions of sebaceous glands

3. Figure 1 below shows part of an earthworm in motion



Which one of the following correctly describes the state of the muscles and bristles in earth worm in a region of the body labelled X?

   A. Circular muscles are contracted and longitudinal muscles relaxed bristles withdrawn from soil
   B. Circular muscles are contracted and longitudinal muscles relaxed bristles grip and anchor on soil
   C. longitudinal muscles are contracted and circular muscles relaxed bristles withdrawn from soil
   D. longitudinal muscles are contracted and circular muscles relaxed bristles grip and anchor on soil

4. The benefits of territoriality include
   A. pair bonding
   B. rights to defend a home range
   C. increased reproductive success
   D. saving energy needed to chase away invaders

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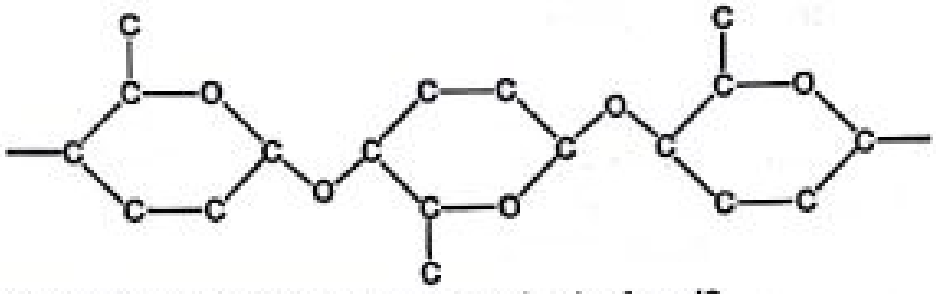
5. In an endergonic reaction, the product of the reaction contains
   A. more energy than the reactants and energy is released
   B. more energy than the reactants and energy must be supplied
   C. less energy than the reactants and energy is released
   D. less energy than the reactants and energy must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

6. The interconversion between pytochromes Pr to Pfr can be facilitated by subjecting the plant to a
   A. flash of red light
   B. flash of far red light
   C. long period of darkness
   D. short period of darkness

7. The diagram shows a section of a polysaccharide.



In which polysaccharide(s) could this section be found?
   1 amylose
   2 cellulose
   3 glycogen

A. 1 only B. 2 only C. 1 and 3 D. 2 and 3

8. Which of these correctly describes the location of the organ of Corti?
   A. Between the tympanic membrane and the oval window
   B. In the utricule and saccule
   C. Between the median canal and tympanic canal
   D. Between the tectorial membrane and the Basilar membrane

9. Fixed action patterns in organisms are best known as
   A. reflexes
   B. innate behaviors
   C. learned behavior
   D. conditioning

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10. Plants do not have a circulatory system for transporting gases yet they can be extremely large. This is because

A. they have few living cells most of the plant being deadwood
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

11. When running the insect makes tripod gaits, this involves

A. Two middle legs of the body and one front leg in contact with the ground and rest lifted
B. Front and middle legs on one side of the body and one hind leg on the opposite side are lifted
C. Hind and middle legs on one side of the body and one front leg on the opposite side are lifted
D. Front and hind legs on one side of the body and one middle leg on the opposite side are lifted

12. If the distance between the alleles for black body and purple eyes is 6 map units apart, that between the eyes and vestigial wings alleles is 12.5 unit and between black body and vestigial wing alleles is 18.5. The order of the alleles on the chromosome must be;

A. purple eyes, vestigial wings, black body
B. Black body, purple eyes, vestigial wings
C. vestigial wings, black body, purple eyes
D. black body, purple eyes, vestigial wings

13. Which of these are not useful in thermoregulation of an endotherm in cold weather?

A. brain
B. spinal cord
C. sweat glands
D. skeletal muscle

14. Which one of the following does not involve mass flow?

A. Blood flow in veins
B. Uptake of food by tapeworm
C. Movement of food and water in the gut
D. Transport of water and mineral salts by the xylem

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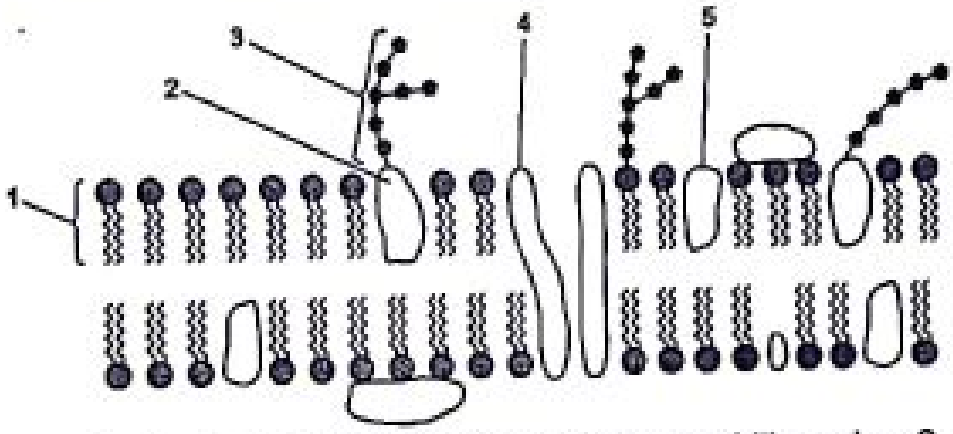
15. Myelinated axons of a frog conduct impulses three times less fast as those of same diameter in a rat because the

A. Myelin sheath in axons of frogs is thinner
B. Rat is endothermic
C. Neurons of a frog have more synapses
D. Frog lives in water which is cold

16. When same response is given to same stimulus on different occasions, the behavior is said to be

A. Imprinted
B. Stereotyped
C. Instinctive
D. Conditioned

17. The diagram shows part of a cell surface membrane.



Which molecules have both hydrophobic and hydrophilic regions?

A. 1, 2, 4 and 5
B. 1, 3 and 5
C. 1 and 5 only
D. 2 and 4 only

18. Which of the following animal dormancy responses are due to day length and other environmental factors an animal is exposed to?

A. Aestivation
B. Hibernation
C. Diapause
D. Kinesis

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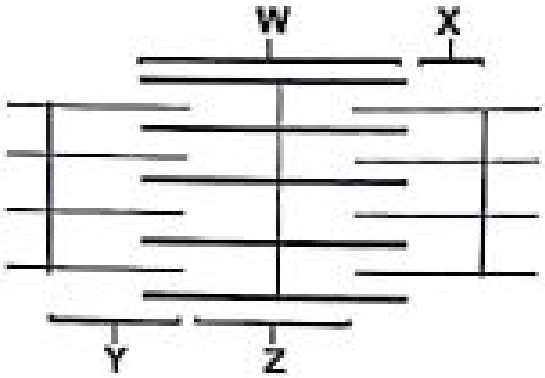
19. A polar bear has a lower lethal temperature than a kangaroo rat because of
A. Better insulation mechanisms in kangaroo rat
B. Large size of the polar bear
C. White body colour of polar bear
D. Better insulation mechanisms in polar bear

20. The figure below shows a longitudinal section of part of a striated myofibril in a skeletal muscle



Which of the following describes the light band of the myofibril?
A. W
B. X
C. Y
D. Z

21. Ulcer patients some times are advised to take milk. Milk intake may stimulate production of
A. Enterogastrone hormone
B. Secretin hormone
C. Cholecystokinin hormone
D. Gastrin hormone

22. Which one of the following is not concerned with the process of inhalation in a mammal?
A. Diaphragm muscles contract
B. Intercostal muscles relax
C. Diaphragm flattens
D. Volume of thorax increases

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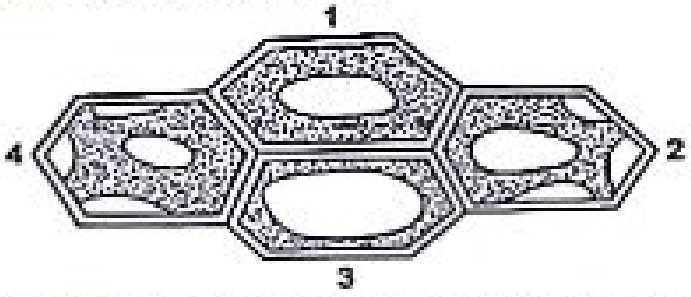
23. The diagram shows four plant cells.



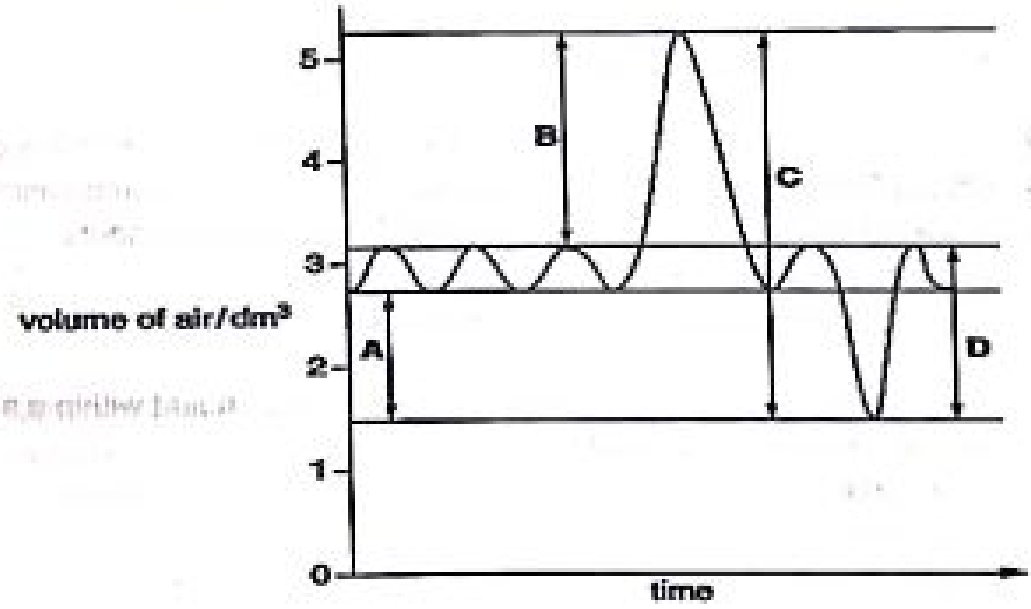
In which direction could there be net movement of water by osmosis?

A. 1 to 2 and 1 to 4
B. 1 to 3 and 1 to 2
C. 2 to 1 and 1 to 4
D. 4 to 1 and 2 to 3

24. The main physiological mechanism by plants to withstand high temperatures in order to avoid wilting in dry conditions is to

A. Produce more abscisic acid
B. Roll leaves
C. Develop thick cuticle
D. Produce gibberellins

25. The diagram shows the changes in human lung volume obtained using a spirometer. Which part of the trace represents the vital capacity?



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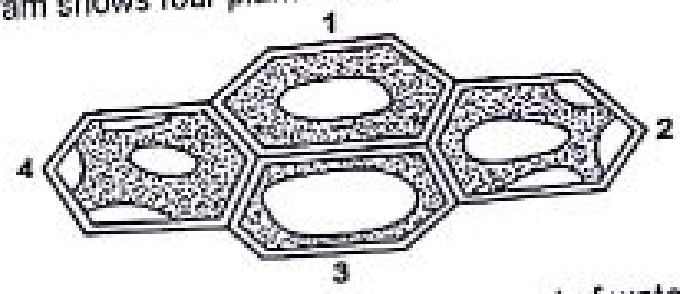

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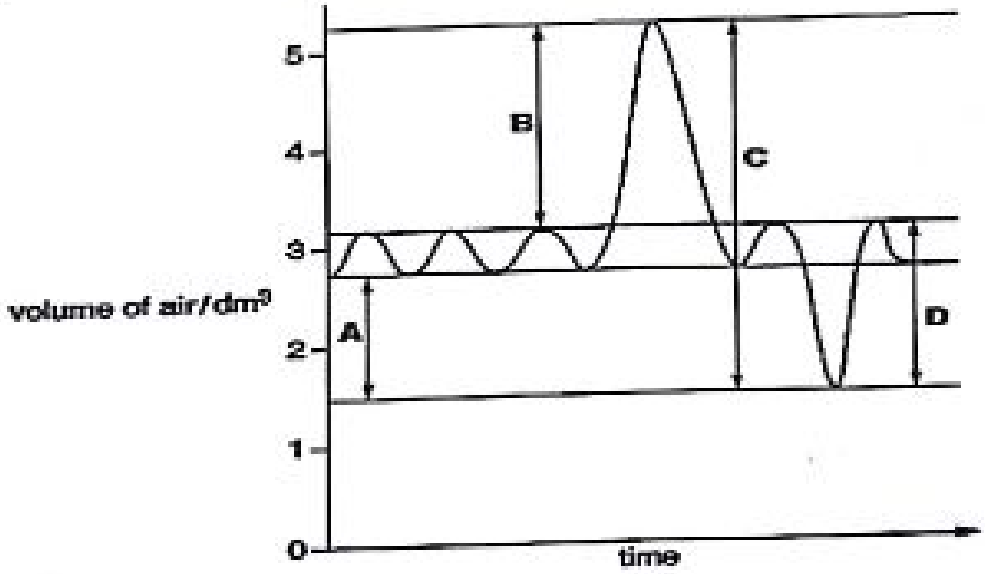

26. In which of the following chordates does the notochord remain unmodified?
A. Cartilaginous fish
B. Bony fish
C. Sea squirts
D. Amphioxus fish

27. Hydrophytes do not have wax-covered leaves because
A. They need much air for fast respiration
B. They do not need to conserve water
C. The wax would make leaves heavy and sink
D. Their leaves cannot synthesize wax

28. Which one of the following is not true about bacterial DNA?
A. Single stranded molecule
B. Nonlinear and circular
C. haploid
D. Has both introns and exons

29. During human embryonic development the mesoderm germ layer gives rise to development of
A. Muscles, blood and skeleton
B. Gut, muscles and skeleton
C. Skin, muscles and gut
D. Neural tube, blood and skin

30. Rigor mortis occurring several hours following death of a mammal is due to
A. Efflux of calcium ions from sarcoplasmic reticulum into sarcoplasm
B. Breaking of cross bridges between myosin and actin filaments
C. Fall in ATP molecules
D. Troponin failing to combine with calcium ions

31. Determining the commonest plant species in a large habitat within a short period can be carried out using the
A. line transect
B. quadrat
C. direct count
D. aerial view method

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32. Microvilli in animal cells are for;
A. exocytosis of secretory products
B. endocytosis of particles
C. limited movement of the cell
D. increasing the surface area for absorption

33. The bond between a glycerol molecule and a fatty acid molecule is:
A. A glycosidic bond
B. A peptide bond
C. A phosphodiester bond
D. An ester bond

34. Which of the following is associated with Bilateral symmetry in organisms?
A. Sessile and limited specialization of body parts
B. Locomotion and greater specialization of body parts
C. Stream lined body and sessile
D. Limited specialization of body parts and locomotion

35. Which condition is caused by a deficiency of vitamin A?
A. anaemia
B. Anorexia nervosa
C. Night blindness
D. rickets

36. The cells responsible for producing the ground substance in the areolar tissues are called
A. Macrophages
B. Mast cells
C. Fibroblasts
D. Adipocytes.

37. When marine fish like shark is transferred from Indian ocean to lake Victoria, it is unable to survive. This is due to its
A. Excretion of trimethylamine oxide a totally non-toxic waste
B. Glomeruli are small and few in number
C. Chloride secretory cells in gills take up more salts from the water
D. Excretion of urea which is less toxic

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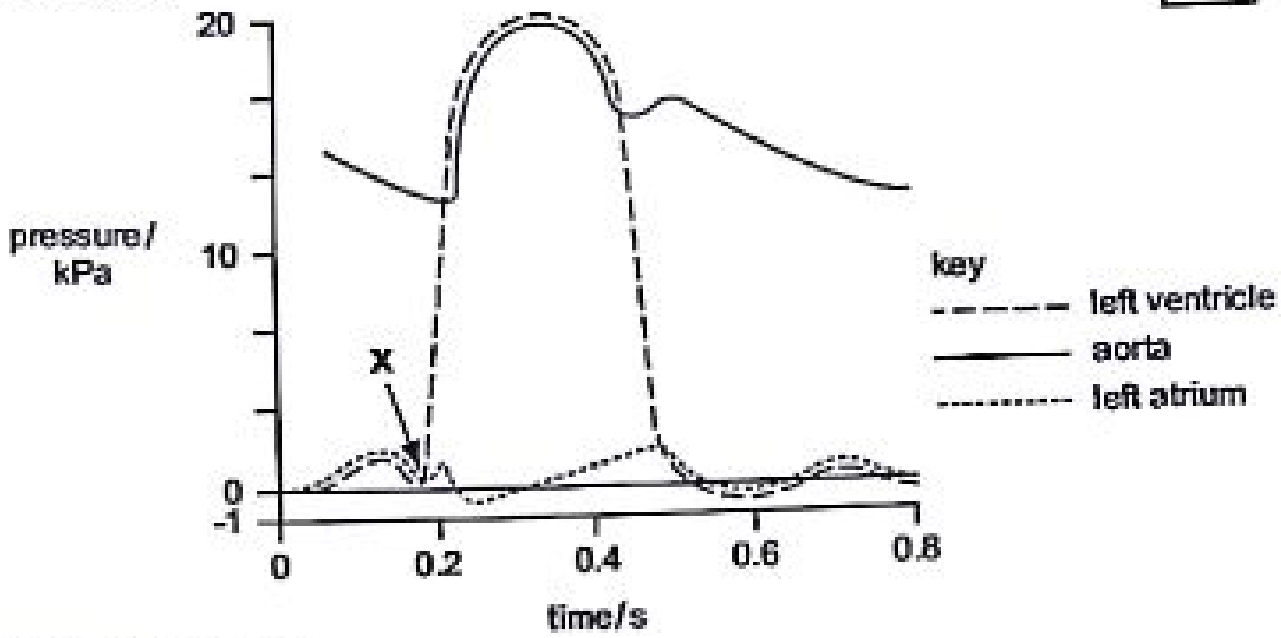
38. The diagram shows pressure changes in the left side of the heart during the cardiac cycle



What happens at X?

A. atrioventricular valves close
B. atrioventricular valves open
C. semilunar valves close
D. semilunar valves open

39. Which of the following divides by mitosis to give rise to two male nuclei, before double fertilization in flowering plants?

A. Polar nuclei
B. Tube nucleus
C. Generative nucleus
D. Synergids

40. During secondary growth in plants, the cork cambium forms

A. Medullary rays
B. Secondary cortex
C. Secondary xylem
D. Annual rings

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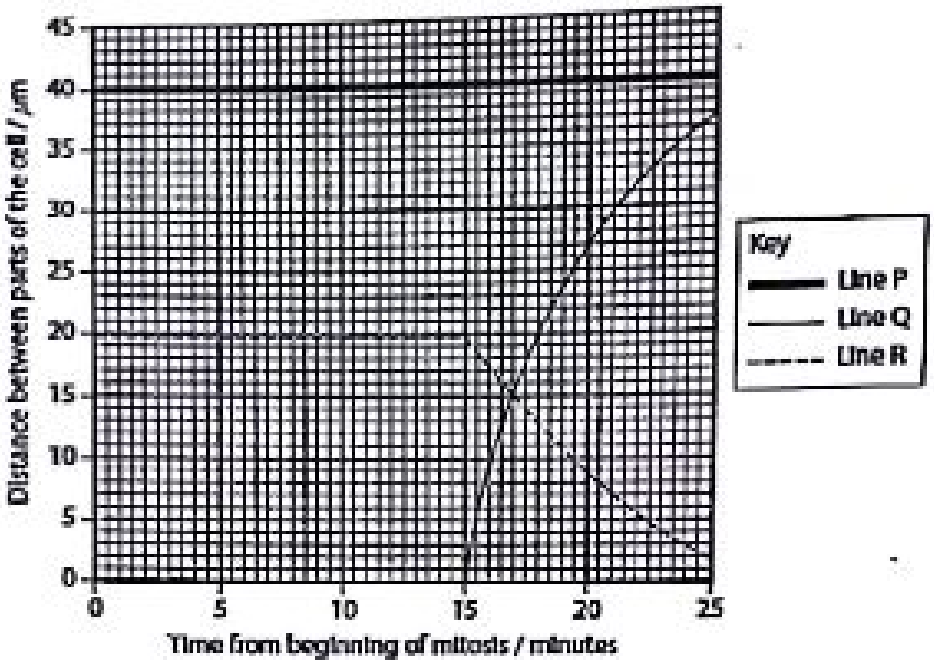
SECTION B (60 MARKS)

41. The graph below shows the changes in the distance that occur between the parts of the cell during mitosis.



(a) Complete the table to identify which line represents the distances between the parts of the cell (01½ marks)

Distance between parts	Line
Two poles of the cell	
A chromosome and a pole	
Two identical chromosomes	

(b) (i) At what time did anaphase begin? (01 mark)

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(ii) Explain one piece of evidence from the graph to support your answer (01 mark)

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(c) Explain the trend in distance represented by lines

(i) Line P (01¼ marks)

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(ii) Line Q (02 marks)

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(iii) Line R (03 marks)

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42. (a) Briefly explain what is meant by the terms (02 marks)

(i) Endangered species

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(ii) Extinction

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(b) State four human activities which increased the rate of extinction of certain species in the recent times (04 marks)

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(c) Suggest four practical measures that can be put in place to prevent extinction of a species in your country. (04 marks)

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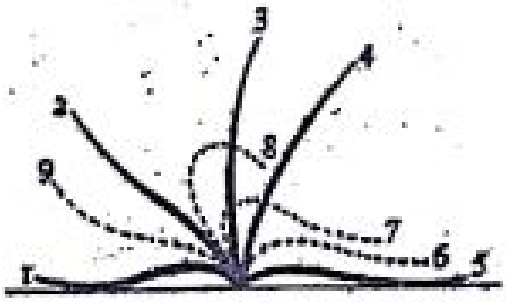
43. The diagram below shows the successive positions of a single cilium on the body surface of a paramecium



(a) Indicate on the diagram the direction of movement of the paramecium as it progresses forward. (01 mark)

(b) Which of these positions represent the (02 mark)

(i) Effective stroke.....

(ii) Recovery stroke .....

(c) Describe how exactly effective stroke is achieved in ciliary movement. (03 marks)

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(d) Describe four importances of ciliary movements in animals. (04 marks)

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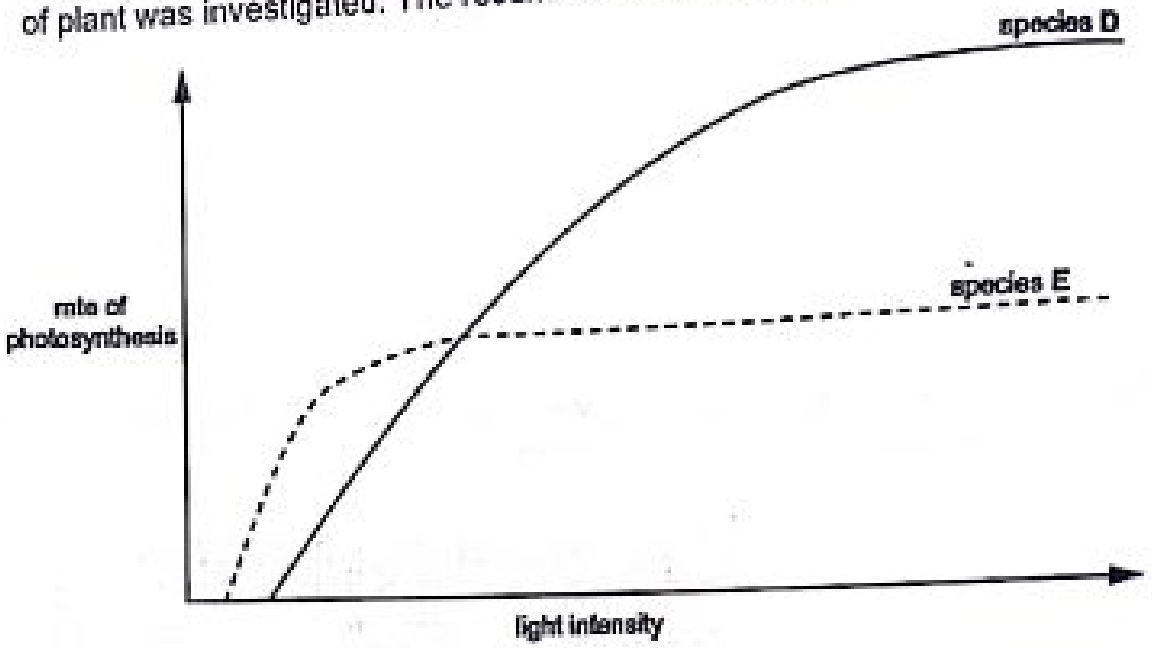
44. The rate of photosynthesis at different light intensities for two different species of plant was investigated. The results are shown in Figure below



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

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(b) Suggest four ways in which the structure of the leaves of species D and species E will differ. (04 marks)

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(c) Describe briefly the role of light in photosynthesis. (03 marks)

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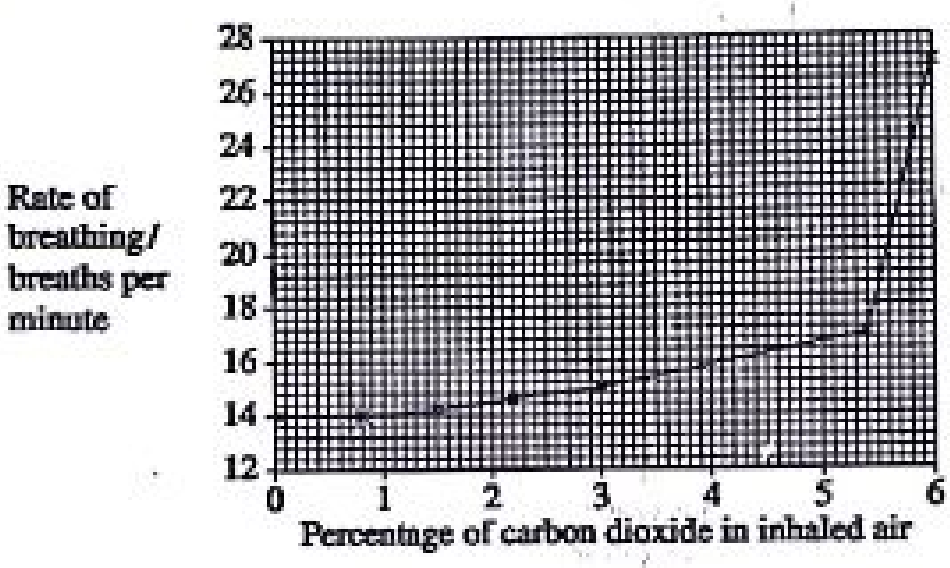
45. Figure below shows the effect of increasing the percentage of carbon dioxide in inhaled air on the rate of breathing



(a) Describe what the graph shows about the effect of increasing the percentage of carbon dioxide in inhaled air on the rate of breathing. (03 marks)

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(b) Explain the effect of increasing the percentage of carbon dioxide in inhaled air on the rate of breathing. (04 marks)

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(c) In light of information provided by the graph show why mouth-to-mouth resuscitation is a better means of artificial respiration in a fainted patient than pressing on the chest wall. (03 marks)

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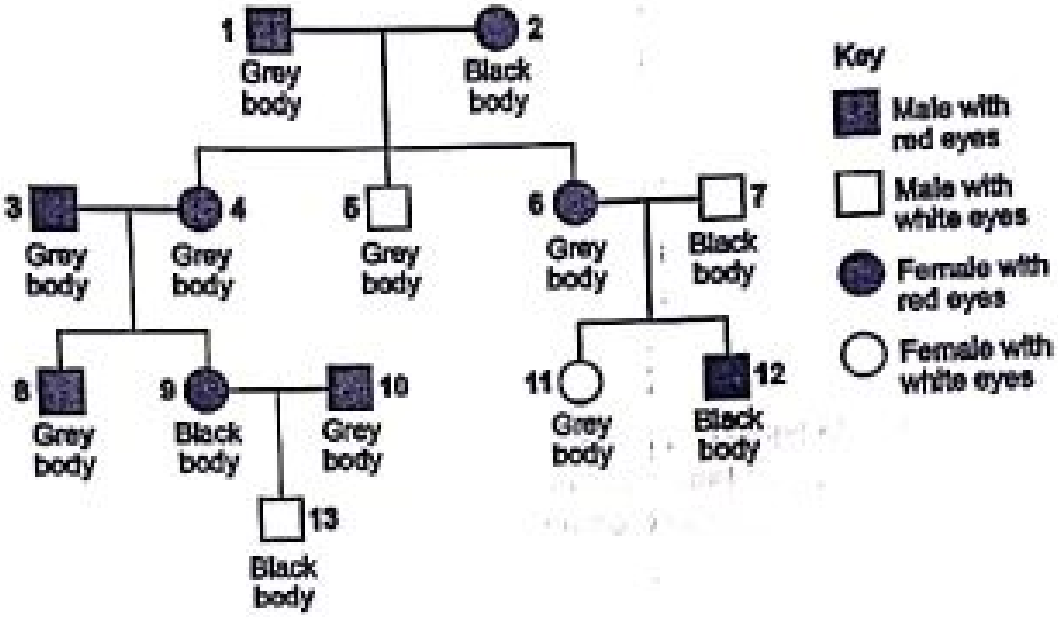
5. In fruit flies, a gene for body colour has a dominant allele for grey body, G, and a recessive allele for black body, g. A gene for eye colour has a dominant allele for red eyes, R, and a recessive allele for white eyes, r, and is located on the X chromosome. Figure shows the phenotypes of fruit flies over four generations



(a) (i) Give the full genotype of the fly numbered 6 in Figure above (01 mark)

Genotype .....

(ii) Give one piece of evidence from Figure above to show that the allele for grey body colour is dominant. (01 mark)

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(b) Explain one piece of evidence from the Figure to show that the gene for body colour is not on the X chromosome. (02 marks)

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(c) A heterozygous grey-bodied, white-eyed female fly was crossed with a black-bodied, red-eyed male fly. Complete the genetic diagram below to show all the possible genotypes and the ratio of phenotypes expected in the offspring from this cross. (04 marks)

Phenotypes of parents: Grey-bodied, white-eyed female × Black-bodied, red-eyed male

Genotypes of parents: ×

Genotypes of offspring

Phenotypes of offspring

Ratio of phenotypes

(d) A population of fruit flies contained 64% grey-bodied flies. Use the Hardy–Weinberg equation to calculate the percentage of flies heterozygous for gene G. (02 marks)

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