NAME..... CENTREINDEX NO.....

SIGNATURE.....

P530/1

BIOLOGY

PAPER 1

2 ½ hours

ASSHU MID- WESTERN REGIONAL JOINT MOCK EXAMINATIONS 2018

UGANDA ADVANCED CERTIFICATE OF EDUCATION

BIOLOGY

PAPER 1

2Hours and 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 boxes provided

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 EXAMINERS USE ONLY

SECTION A		
SECTION B	41	
	42	
	43	
	44	
	45	
	46	
TOTAL		

1. The most direct way to control the expression of genes in bacteria is to regulate the rate of:
   (A) mRNA processing
   (b) transcription
   (C) translation of mRNA
   (D) Modification of the polypeptides into final products

2. Which of the following are examples of genetic drift?
   (i) founder effect
   (ii) gene effect
   (iii) Bottleneck effect
   (iv) Directional selection
   A. (i) and (ii)
   B. (i) and (iii)
   C. (ii) and (iv)
   D. (i) , (ii) and (iii)

3. Cells of the pancreas can incorporate radio actively labelled amino acids. The amino acids are then found to be used in the synthesis of an enzyme that is eventually secreted by the cell. Which of the following is the pathway for the movement of these amino acids in the cell?
   A. ER-Golgi apparatus ⟶ vesicles that fuse with cell surface membrane
   B. ER- Golgi apparatus ⟶ lysosome
   C. Golgi apparatus ⟶ ER ⟶ lysosome
   D. Golgi apparatus ⟶ ER ⟶ Vesicles that fuse with cell surface membrane

4. A decrease in the partial pressure of carbon dioxide in the blood would cause;
   A. a generation of excitatory impulses by respiratory centre in the medulla to intercostals muscles and diaphragm
   B. a decrease in breathing rate
   C. a stimulation of the peripheral chemo receptors in aortic and carotid bodies
   D. an increase in thoracic volume

5. Ovulation does not occur during pregnancy in the human female because;
   A. menstruation does not occur during pregnancy
   B. the embryo produces large amounts of hormones that inhibit the F.S.H
   C. the blood supply to the follicles in the ovary is temporarily halted
   D. the corpus luteum and later the placenta produces large amounts of progesterone

6. Which of the following has the lowest water potential?
   A. mesophyll cell
   B. Root hair
   C. Endodermal cell
   D. xylem vessel in stem

7. In a population where 7% of the babies are born with sickle cell anaemia, what is the frequency of the babies born having heterozygous genotype?
   A. 0.005
   B. 0.389
   C. 0.74
   D. 0.26

8. In Eutherian mammals, the placenta is formed from the;
   A. amnion and chorion
   B. amnion and allantois
   C. chorion and allantois
   D. allantois and Yolk sac

9. Which of the following is not true in the production of root pressure?
   A. mineral ions are actively pumped into xylem by endodermal cells
   B. ATP is required
   C. water potential in the xylem is increased
   D. The casparian strip in the endodermis prevents the back flow of mineral ions into the cortex cells

10. The heart sound "dup" which can be heard represents;
   A. the flow of blood into the heart
   B. the flow of blood from the atria into ventricles
   C. the closure of the atrio ventricular valves
   D. closure of semilunar valves

11. Genes P, Q, R and S are linked on the same chromosome. The following are the cross over-values between the genes
   P and Q –38%
   P and R –26%
   Q and S –16%
   R and S –4%
   The sequence of genes on the chromosome id:
   A. PRSQ
   B. PSRQ
   C.QSRP
   D.RSQP

12. Endo parasitic organisms increase their numbers by these methods;
   (i) paedogenesis
   (ii) apomixix
   (iii) internal fertilization
   (iv) polyembryony

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

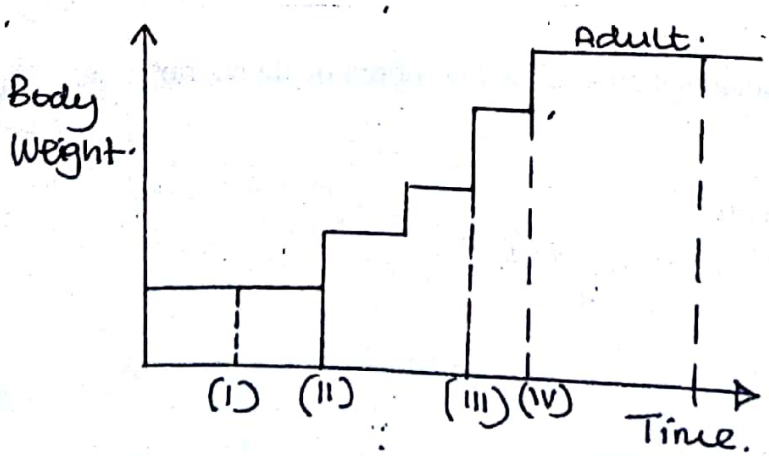
13. An organism with more than two sets of chromosomes derived from the same species is known as:
A. aneuploid
B. amphidiploid
C. allopolyploid
D. autopolyploid

14. An action potential propagated along transverse tubules causes release of calcium ions from the
A. actin filaments
B. myosin filaments
C. sarcoplasm
D. sarcoplasmic reticulum

15. Victims of cyanide poisoning may die of histoxic hypoxia.The oxygen supply to the tissue is normal but the cells cannot use the oxygen available to them. This is because cyanide blocks the action of;
A. haemoglobin
B. acetylcholine
C. cytochrome-a
D.myoglobin

16. Which of the following features could be used to distinguish between earth worm (annelida) and tape worm (platyhelminthes)?
A. Radial symmetry and body shape
B. Segmentation and number of germ layers in body wall
C. segmentation and number of body cavities
D. pseudocoelomate and flattened body

17. The graph below depicts insect growth



when is ecdysone secreted without neotonin?

A (i)

B (iv)

C (iii)

D (ii)

18. The cortical reaction of the mammalian eggs is important in the ;
    A. breakdown of the oocyte membrane to facilitate penetration of sperm
    B. breakdown of sperm membrane to release enzymes of the a crosome
    C. fusion of egg and sperm nuclei
    D. cortical granules release enzymes that harden zona pellucida

19. If there are 10^2bacterial cells per cm^3 at early lag phase and the generation time of bacterial cells is 20 minutes, how many cells will there be two hours later?
    A. 6×10^2
    B. 6×10^3
    C. 6.4×10^3
    D. 1×10^7

20. Which of the following statements is true of T- cells ***but*** not true of B-cells?
    A. They are produced by cells which originate in the bone marrow
    B. They react with antigens to produce clone of immunocytes
    C. They must pass through the thymus gland before they can become fully functional
    D. They have antigen receptors on their cell surface membrane

21. Both plants and animals have haploid and diploid stages in their life cycles. How ever, only plants are considered to have alternation of generations. This is because only in plants ;
    A. the gametophyte and sporophyte generations are free living
    B. the gametophyte generation is haploid and the sporophyte generation is diploid
    C. both sporophyte and gametophyte generations are multicellular
    D. either the sporophyte or gametophyte generation may be dominant at different stage of its lifecycle

22. Which of the following is ***not*** an example of genetic drift?
    A. Evolution of organisms on Galapagos islands distant from mainland
    B. A new population of self pollinating plants which originate from dispersal of a single seed
    C. The loss of genetic variety of northern elephant seals on the island of Gaundalupe
    D. The migration or mating of individual among populations

23. In an experiment , a 25cm X 25cm quadrant was used to determine the density of plant *Mimosa pudica* in areas **P** and **Q** .**The results of the experiment were as below:**

Quadrat	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Number of plants in areas **P**	3	6	7	O	3	2	1	5	O	3
Number of plants in areas **Q**	3	4	3	2	1	O	4	1	2	O

what is the density of the plant *mimosa pudica* per square metre in areas **P** and **Q**

	Area P	**Area Q**
A.	20	16
B.	30	20
C.	48	32
D.	60	40

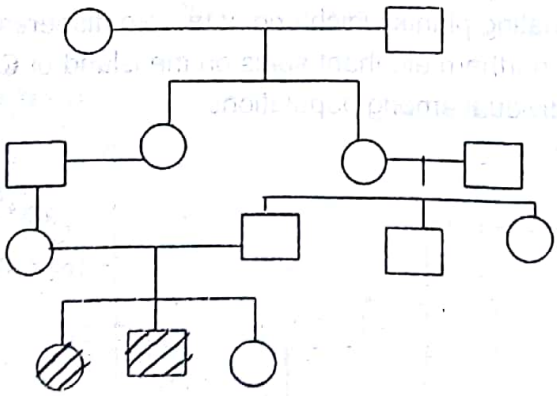
24. Which of the following mechanisms can cause sympatric speciation

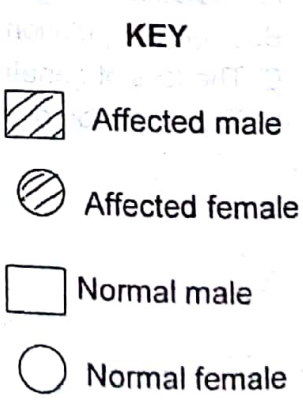
9i) Geographic isolation
(ii) polyploidy
(iii)Hybrid inviability
(iv) Genetic drift
A. (ii) and (iii)
B.(i), (ii) and (iv)
C. (ii) , (iii) and (iv)
D. (i) , (ii), (iii), and (iv)

25. Which of the following pairs does **not** correctly match the cell type with its function?

A. Macrophage ⟶ ingest bacteria
B. plasma cell ⟶ produce antibodies
C. Helper cell ⟶ cause lysis of infected cell
D. Memory cell ⟶ divides to produce instantaneous response in secondary infections

26. The pedigree below shows the inheritance of a disease





The inheritance of the disease is controlled by:

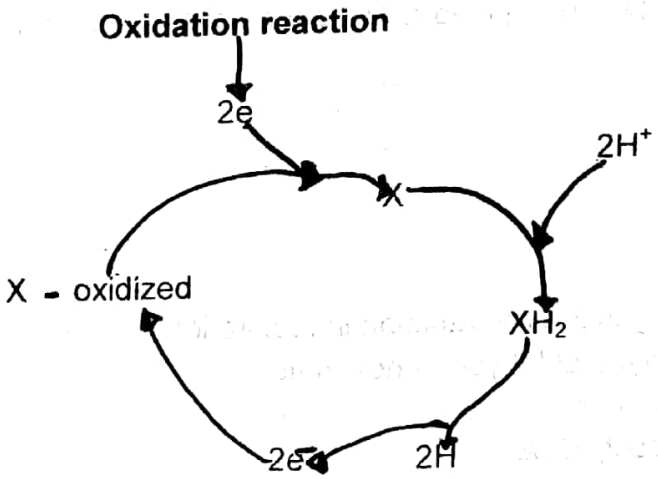
A. autosomal recessive gene
B. autosomal dominant gene
C. X linked recessive gene
D. X linked dominant gene

27. Which of the following statements are true of the placenta

(i) it is formed after the first trimester
(ii) it is composed of foetal and maternal tissues
(iii) it synthesizes and secretes gonadotropins
(iv) it is attached to uterine wall by the umbilical cord

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

28. The diagram below shows a simplified scheme of electron transport system



In the above scheme, **X** represents;

A. FAD
B.NADH
C.$NADP^+$
D. Co-enzyme A

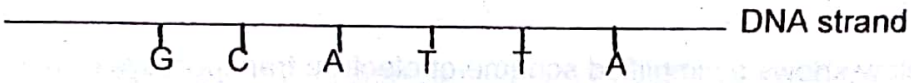
29. Which of the following is true concerning aldosterone?

A. it increases secretion of angiotensinogen
B. It is produced by the juxtaglomerular complex
C. it increases the permeability of renal tubes to water
D. It increases the sodium reabsorption in DCT and collecting ducts

30. In which of the following parts of the mammalian testis does meiosis occur?
A. primordial germ cells
B. seminiferous tubules
C. leydig cells
D. Sertolic cells

31. The electron transport chain in the inner membrane of mitochondria and thylakoid membrane of the chloroplast is coupled directly with;
A. production of organic molecules
B. synthesis of NADH and NADPH
C. release of carbondioxide
D. synthesis of ATP

32. The diagram shows part of a single strand of DNA



How many hydrogen bonds are required to link base pairs when both complementary strands are present
A. 6
B.28
C.32
D.14

33. Which one of the following is the link reaction in respiration?
A. glucose → glyceraldehydes-phosphate
B. pyruvate → lactate
C. pyruvate → acetylCoA
D. Citrate → α - ketoglutarate

34. What is the next stage after acetylcholine has attached to its receptors at the sarcolemma?
A. calcium ions bind to troponin
B. calcium ions are released from the sarcoplasmic reticulum into sarcoplasm
C. voltage –gated sodium channels open
D. Actomyosin cross bridges are formed

35. What is the name given to the route taken by lactate produced in the skeletal muscles to the liver where it is converted into glucose.
Lactate in muscle → pyruvate → glucose
A. Calvin cycle
B. Krebs cycle
C. ornithine cycle
D. Cori cycle

36. When the blood is acidic , which of the corrective mechanisms are carried out in the distal convoluted tubules

(i) Dihydrogen phosphate ions dissociate to hydrogen phosphate phosphate ions and hydrogen ions

(ii) Tubule cells secrete H^+ ions into tubule lumen

(iii) HCO_3^- and Na^+ ions are transported into blood in the capillaries

(iv) NH_3diffuses into the blood to form ammonium salts

A. (i) and (ii)

B. (i) and (iii)

C.(ii) and (iii)

D.(ii) and (iv)

37. If the respiratory enzymes of two different species whow extensive similarity in their amino acid sequence, then it may be concluded that the two species;

A. belong to the same genus

B. have the same genes that code for the respiratory enzymes

C. are capable of interbreeding

D. evolved from a common ancestor

38. When ***Drosophila*** flies heterozygous for size of wings and body color were crossed with flies with vestigial wings and ebony bodies , the F_1offspring obtained were as follows;

Normal wing , grey body	522
vestigial wing,grey body	98
Normal wing, ebony body	104
vestigial wing, ebony body	486

What is the crossover value?

A. 8%

B.9%

C.17%

D. 20%

39. Which of the following describes conditions in a mesophyll cell of a CAM plant exposed to high light intensity during day time?

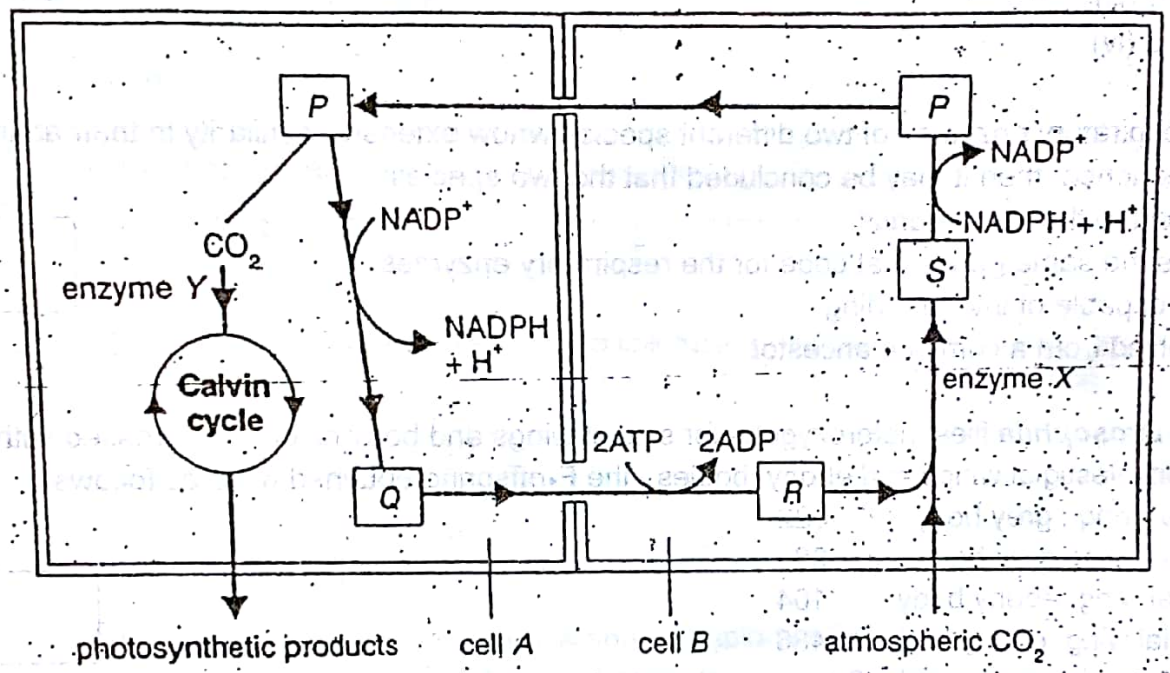
	Concentration of	
Oxalo acetate	Malate	Glycerate– phosphate
A. High	High	High
B. High	High	Low
C. Low	Low	High
D. Low	Low	low

40. The process of vegetative change as a result of destruction of a climax vegetation is called?
A. primary succession
B. secondary succession
C. pioneer plants
D. plagion climax succession

SECTION B **(60 MARKS)**

Answer all questions in this section in the spaces provided

41. The diagram below shows an outline of the main stages in the Hatch and Slack



(a) Give the name of cell **A** and **B** (1 mark)

Cell **A**.....

Cell **B**.....

(b(i) Name the enzymes **X** and enzyme **Y** **(1 mark)**

Enzyme **X**.....

enzyme **Y**.....

(ii) State three differences between the mode of action of enzyme **X** and enzyme **Y** (3marks)

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(c) (i) Name the substances **P, Q, R** and **S** (02 marks)

P.....

Q.....

R.....

S.....

(ii) Explain the importance of Hatch and slack pathway (02 marks)

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(d) Describe the part played by reduced NADP in the light – independent reaction (1 mark)

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42. In plant genus ***spartina*** contains a number of species.Hybridisation between ***spartina alterniflora*** (2n=62) and ***spartina maritima*** (2n=60) has produced a F_1sterile hybrid ***spartina*** *townsendii.*

(a) What is meant by:

(i) Hybridisation? (1 mark)

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(ii) Sterile hybrid (1 mark)

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(b)(i) Explain why the F_1 hybrid cannot reproduce sexually (2 marks)

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(ii) Name the method by which the F_1 hybrid can propagate in its habitat (1 mark)

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(c) chromosomal change has occurred naturally in the F1 hybrid and a fertile F_2 tetraploid plant ***spartina anglica*** is produced

(i) Describe briefly with aid of a diagram the chromosomal changes that may have occured to produce fertile grass (3 mark)

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(d) Give two reasons why polyploidy is more common in plants than in animals(2 marks)

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43. (a) Give three ways in which a frog and mammal differ structurally from each other (3 marks)

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(b) Explain the importance of the following major evolutionary advances in the animal body.

(i) Bilateral symmetry (1 mark)

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(ii) Development of coelom (3 marks)

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(iii) Body segmentation (2 marks)

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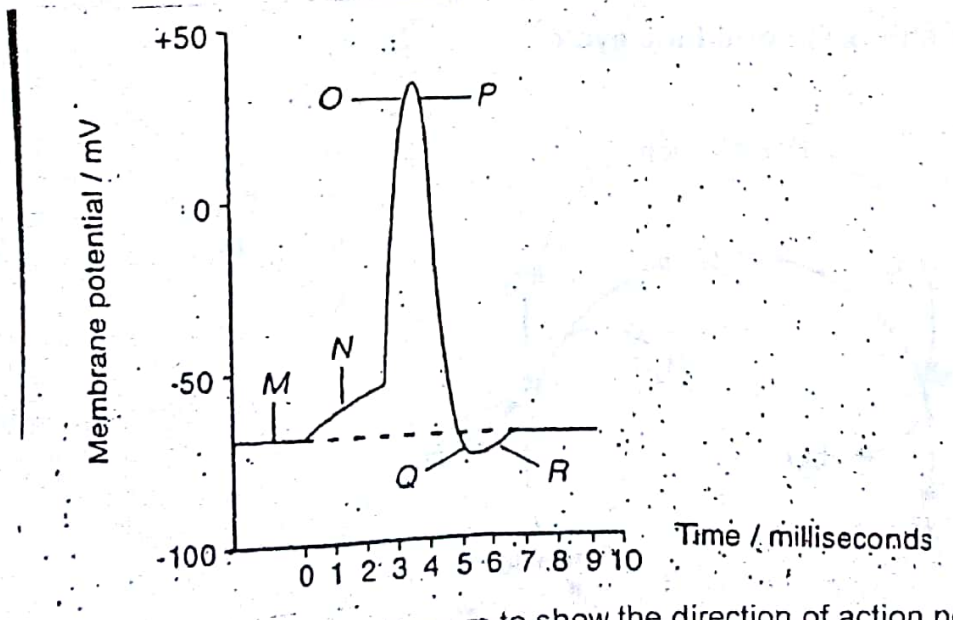
44. The diagram below shows the changes in potential difference across an axon membrane as a nerve impulse passes along it



(a) Draw an arrow on the diagram to show the direction of action potential in the axon

(b) Explain in terms of ion movement the change in potential difference that takes place at **N**, **O**, **P** and **Q**.

(i) **N** (2 marks)

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(ii) **O** (2marks)

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(iii) **P** (2 marks)

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(iv) **Q** (2 marks)

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(c) State what happens at point **R**? (1 mark)

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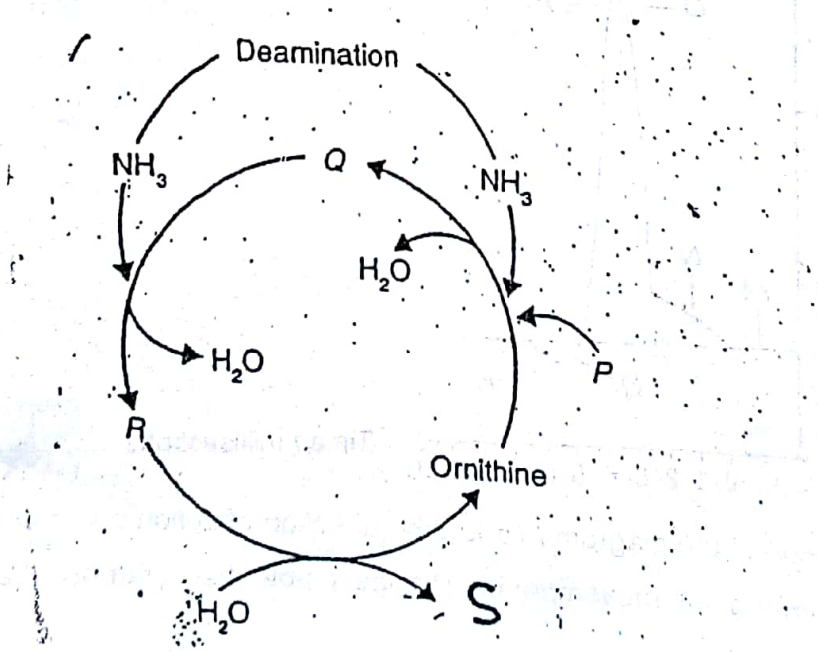
45. The diagram below shows the **ornithine cycle**



(a) What do substances **P**,**Q** and **R** represent? (1 ½ marks)

P.....

Q.....

R.....

(b) Outline the major steps involved in the formation of substance **S** (5 marks)

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(c) State two advantages of excreting substance **S** instead of ammonia (2 marks)

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(d) Explain why nitrogenous wastes do not normally occur in plants? (2 marks)

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46. The following data was obtained in an investigation of factors affecting mortality of two species of moths. The larvae of species **P** eat the leaves of cabbage plants while the larvae of species **Q** feed on leaves of the mustard plant.

Stage of life history		Number of individuals surviving to the end of each stage as a percentage of the number entering the stage	
		Species **P**	Species **Q**
Instar	1	90	92
	2	95	89
	3	80	75
	4	66	72
	5	48	64
Prepupal		65	70
Pupa		79	63

(a) If 200 eggs were hatched , calculate the number of species **P** which are expected to survive to the end of the 5th instar stage .*Show your working and give answers correct to nearest whole number* (3 marks)

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(b)(i) What is the percentage survival of the larvae of species **P** at the end of the 5th instar? (1 mark)

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(ii) The percentage survival of larvae of species **Q** at the end of the 5th instar is about 28%.Compare the survival rates up to this stage of both species (1 mark)

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(c) State two differences in the survival pattern of the two species at the prepupal and pupal stages (2 marks)

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(d) Suggest four factors which could limit the population of species **P** and **Q** , given that these larvae are common pests in vegetable gardens (4 marks)

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