NKHOTAKOTA SECONDARY SCHOOL

2018 MSCE MOCK EXAMINATIONS

Total Marks	BIOLOGY PAPPER I	Marks Scored
100	**THEORY**	

NAME:_____CLASS _____

Subject Number: M022/I

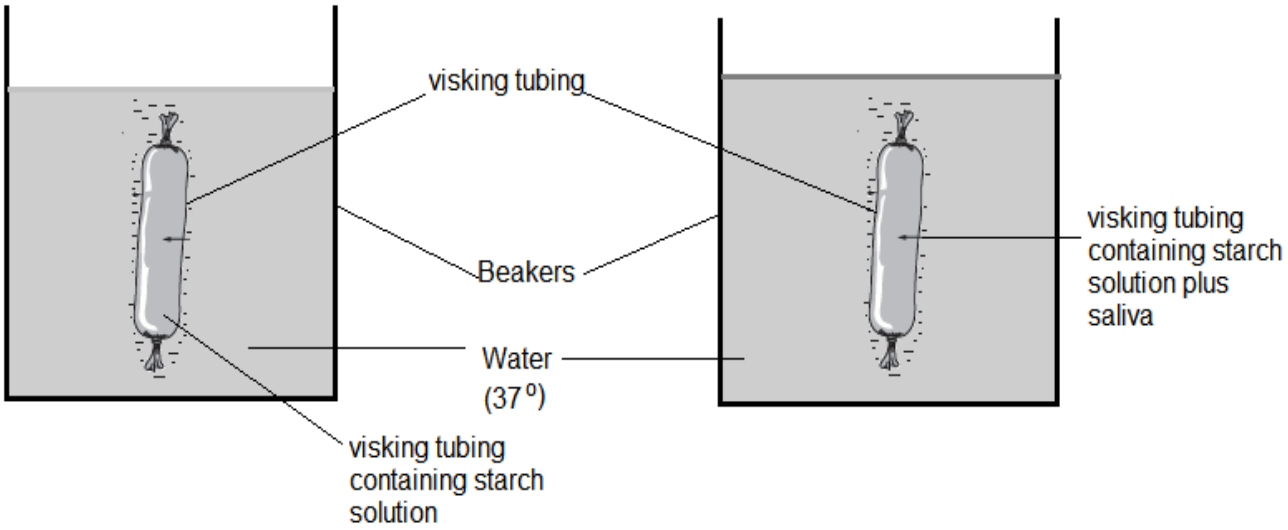
Wednesday, March 21, 2018 **Time Allowed: 2 Hours 30 Minutes**

Instructions:

- Write your name and class stream you belong to in the spaces created above.
- Answer all questions in all sections
- Hand in this paper as soon as time is called for you to stop writing.

SECTION A

1. The figure below shows a diagram of apparatus used in an experiment on digestion.



a) The water in both beakers was tested for starch and sugar before immersing the visking tubing. The results showed that water did not contain starch or sugar. Thirty minutes later, the water in both beakers was again tested for starch and sugar.

What results might have been obtained in:

i. Beaker A. _____

_____ [1]

ii. Beaker B. _____

_____ [1]

b) Explain your answer to question (a) ii _____

_____ [2]

c) What do the results in (a) i and (a) ii tell you about the property of visking tubing?

_____

_____ [2]

d) What was the importance of keeping the water in the beakers at 37^0C in the above experiment/

_____

_____

_____ [2]

2. a) Name the process through which a complex sugar is converted into a simple sugar

_____ [1]

b) Besides glucose, give one other example of a monosaccharide sugar

_____ [1]

c) Sucrose is a common example of a disaccharide.

i. Give one common source of sucrose _____ [1]

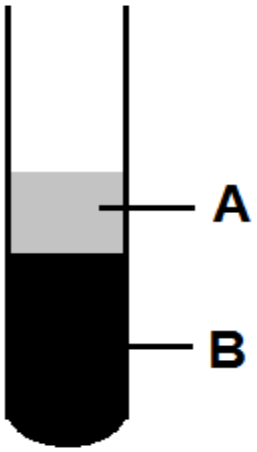
ii. How would you convert sucrose to glucose in the laboratory?

_____

_____

_____ [2]

3. The figure below represents a test tube containing blood which was left to stand overnight.



a) Name the part of blood labelled A _____ [1]

b) Name any two structures you would find in the part labelled B and state a function of each

i. Structure _____ [1]

ii. Function _____

_____ [2]

iii. Structure _____

_____ [1]

iv. Function _____

_____ [2]

c) What anticoagulant could have been added to the blood to prevent it from clotting?

_____ [1]

d) Describe how you would use the contents of the test tube in the figure above to demonstrate that blood contains glucose.

_____

_____

_____

_____

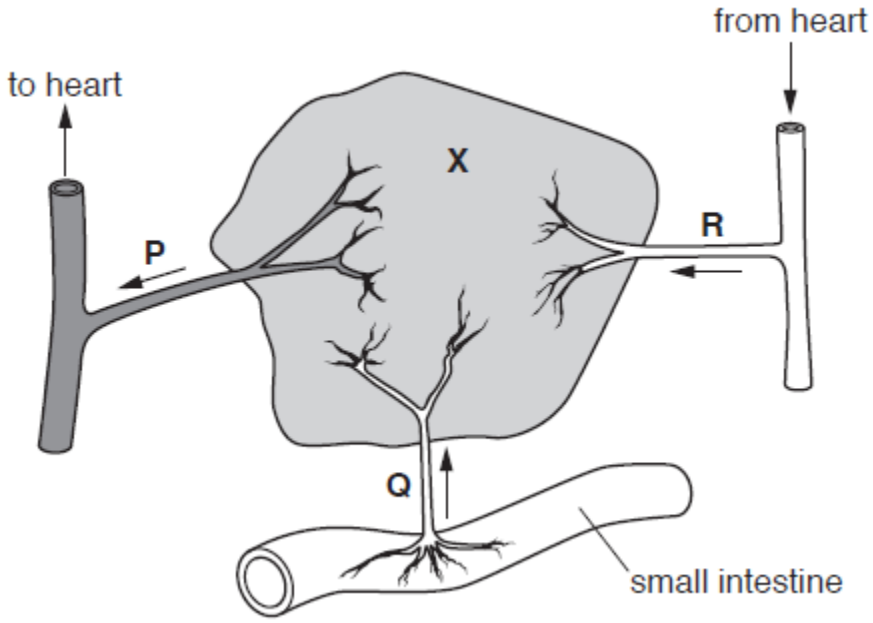
_____

_____

_____ [4]

SECTION B

4. Figure below shows an organ, **X**, and its associated blood vessels **P**, **Q** and **R**.



Organ **X** is involved in the following processes:

- ❖ the metabolism of amino acids,
- ❖ the breakdown of chemical substances, including alcohol.

a) Name organ X and each of its associated blood vessels.

organ **X** .....

blood vessel **P.** .....

blood vessel **Q.** .....

blood vessel **R.** ..... [4]

b) Compare the structure of the blood vessels **P** and **R** in the figure above

_____

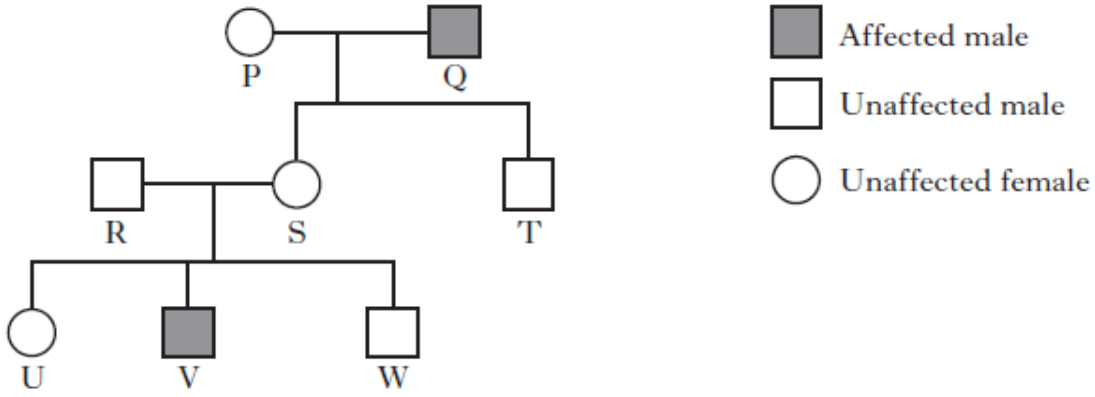
_____

_____

_____

_____ [3]

5. Red-green colour deficiency in humans is caused by a mutation in the gene coding for one of the proteins needed for normal colour vision. This gene is sex-linked and the allele for colour deficiency **d** is recessive to the allele for normal colour vision **D**.



a) Give the term used to describe a female who is heterozygous for a recessive sex-linked characteristic.

_____ [1]

b) Give the genotypes of each of the following individuals.

Q. _____

S. _____

W. _____ [3]

c) Explain how information from the diagram confirms that the allele causing red-green colour deficiency is recessive.

_____

_____

_____ [2]

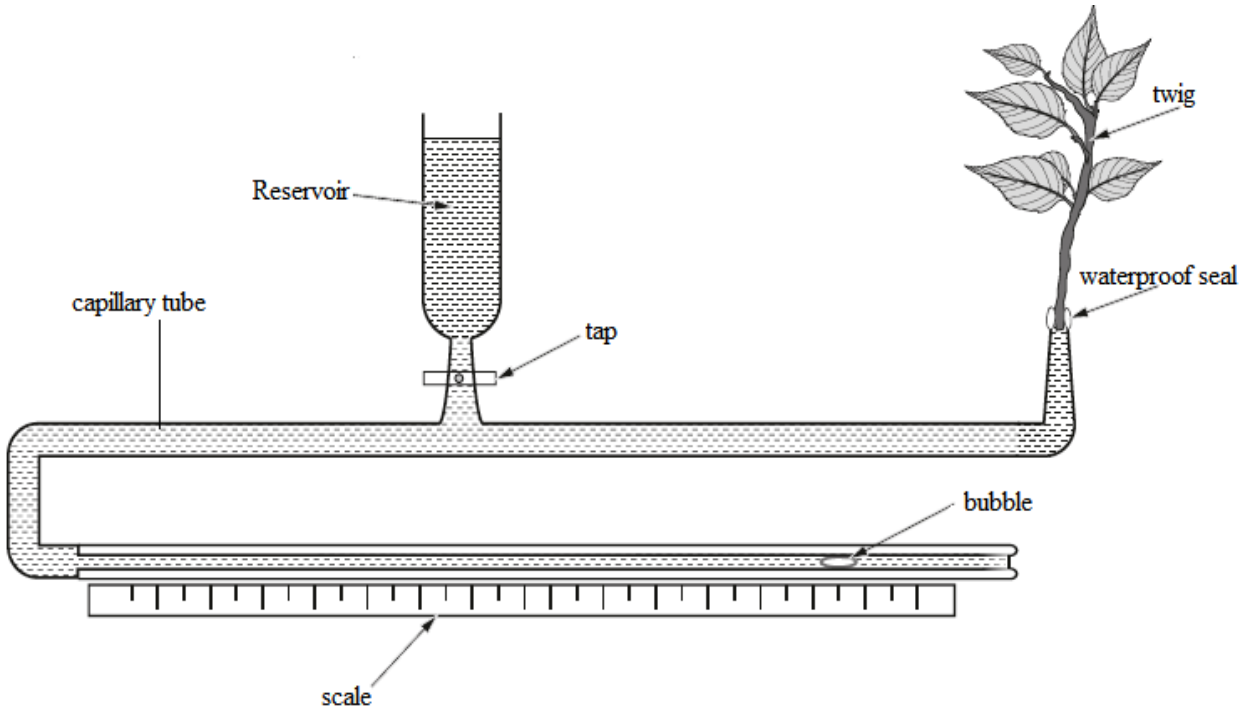
d) Explain why males are more likely to be affected by recessive sex-linked conditions such as red-green colour blindness than females.

_____

_____

_____ [2]

6. A photometer is used to measure water uptake by a plant. Figure below shows the stem and flower of a plant in a photometer. As water is taken up, the bubble moves in the direction shown.



a) Describe the pathway taken by water as it moves from the photometer, through the plant stem and into the surrounding air.

_____

_____

_____

_____

_____ [3]

b) In an experiment, the bubble moved a distance of 60 mm in 10 minutes. Calculate the average rate at which the bubble moved in mm per min.
Space for calculation

…….. mm per min [3]

c) The experiment was repeated in an area of lower light intensity.
Predict and explain what would happen to the rate at which the bubble moved.
Prediction _____

_____ [1]

Explanation _____

_____ [2]

d) State **two** practical measures which should be taken when setting up the apparatus to ensure the potometer functions correctly. Give reasons for your answers.

_____

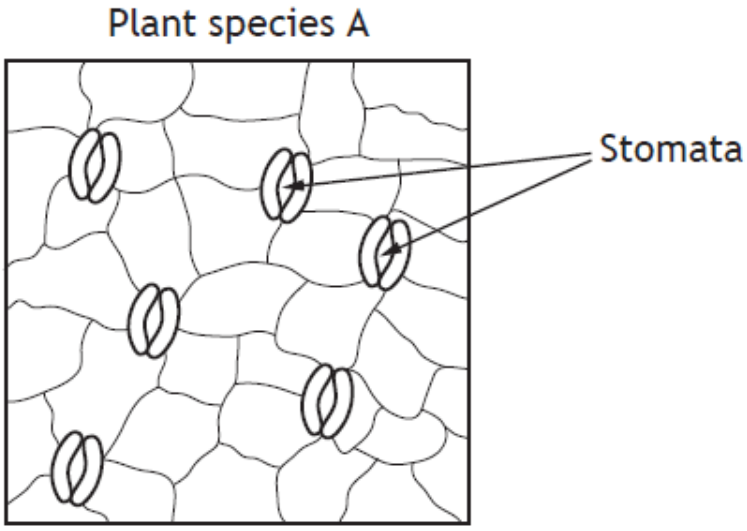
_____

_____

_____

_____ [4]

e) A student investigated the link between transpiration rate and the number of leaf stomata. A microscope was used to look at the number of stomata on a leaf surface of plant species A as shown.



The area shown on the diagram above measures 0·04 mm^2.

i. Calculate the expected number of stomata present in 1 mm^2 on this leaf surface.
Space for calculation

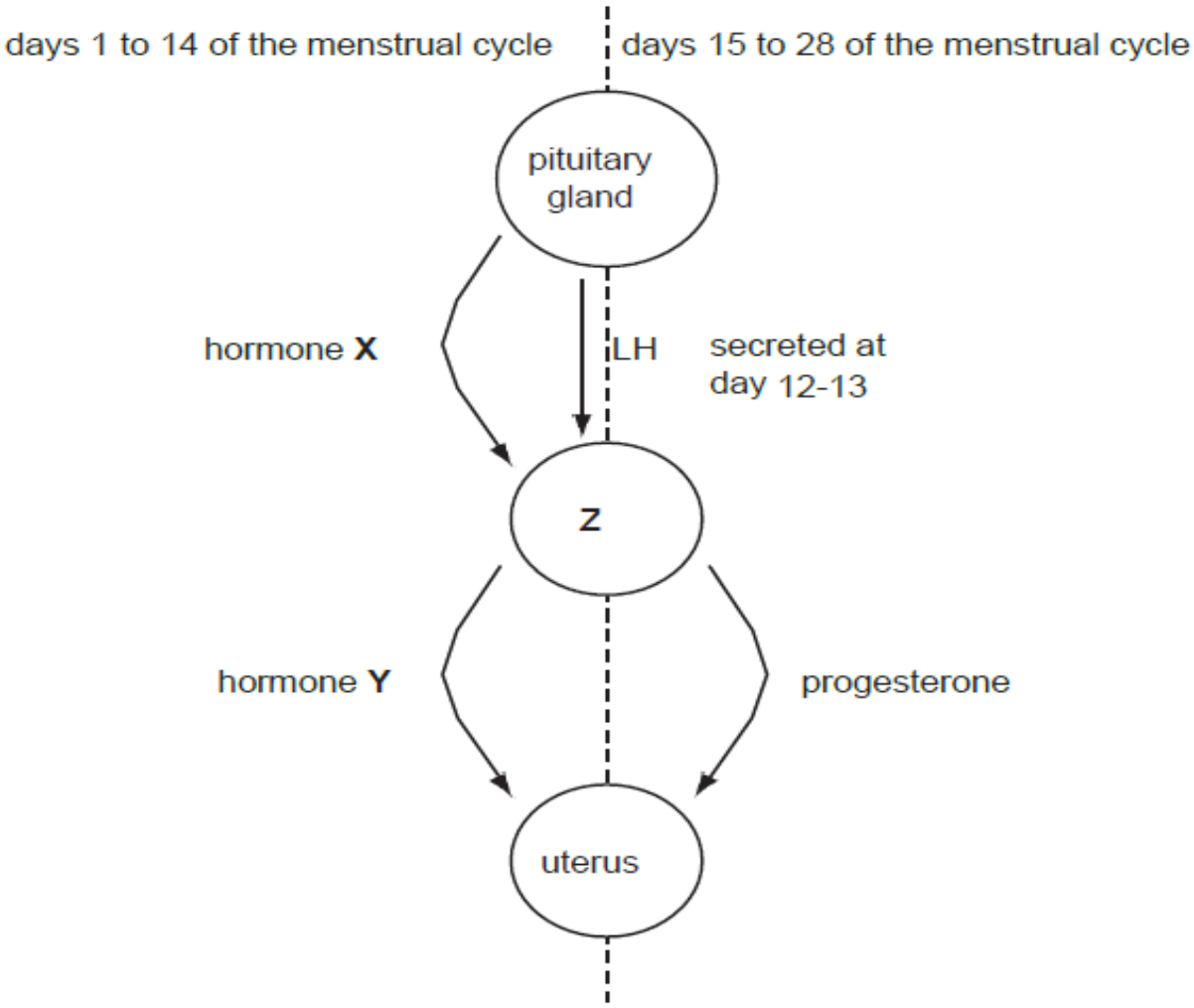
Expected number of stomata …… [3]

ii. A leaf from another plant, species B, had fewer stomata per mm^2 of leaf surface and a different rate of transpiration. It was concluded that the number of stomata present affects the rate of transpiration. Suggest an advantage to plant species B of having fewer stomata.

_____

_____ [2]

7. The human menstrual cycle is controlled by four hormones. Figure below is a diagram that shows the site of production and the target organs of these hormones.



i. Name hormones X and Y.

X _____

Y _____ [2]

ii. Name organ Z. _____ [1]

iii. Describe the roles of progesterone during the menstrual cycle and during pregnancy.

_____

_____

_____

_____ [2]

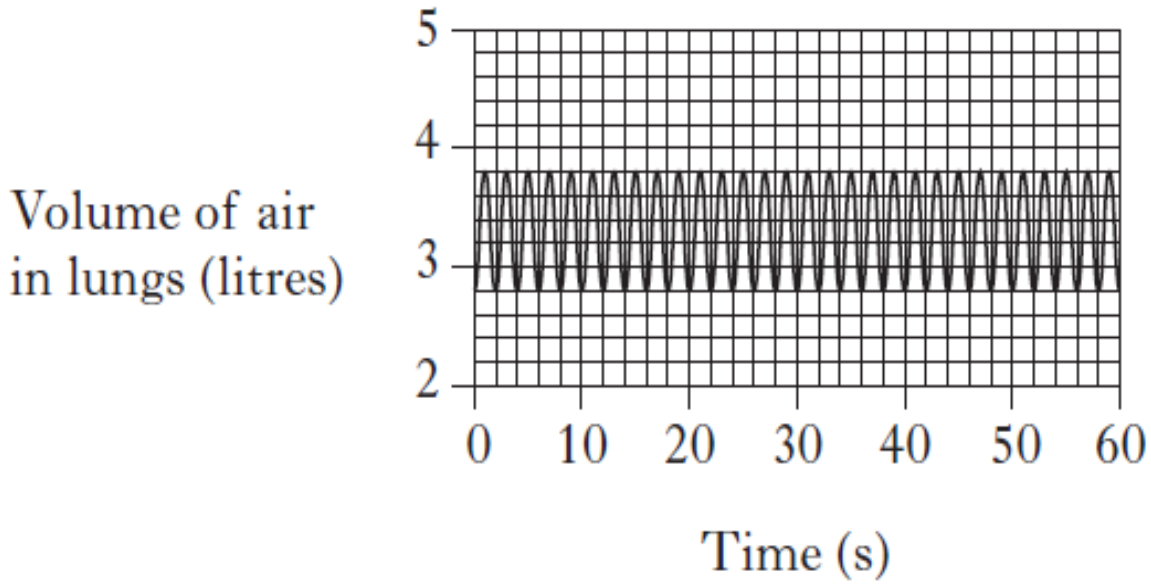
8. Explain why antibiotics may be used to treat a person with AIDS, despite the fact that antibiotics have no effect on viruses.

_____

_____

_____ [2]

9. **A.** The graph below shows the volume of air in the lungs of a person while breathing.



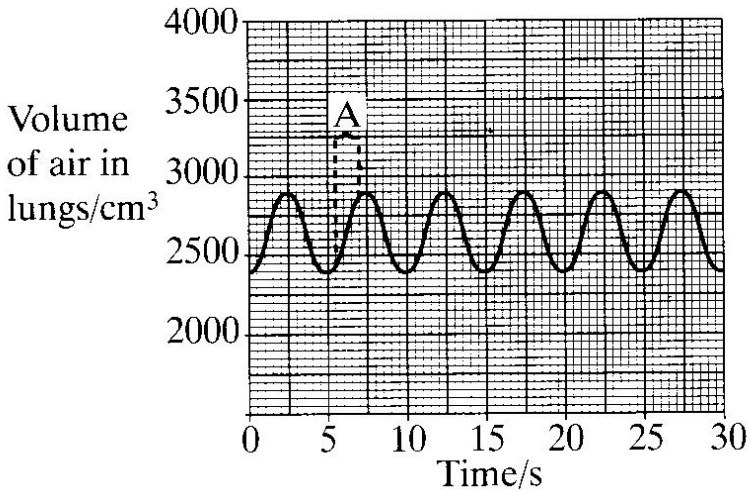
i. What volume of air is inhaled in one breath?
Space for calculation

_____ Litres [2]

ii. What is the person's breathing rate?
Space for calculation

_____ breaths per minute [2]

B. A resting person breathed normally. The total volume of air in the lungs during each breath is shown in the figure below



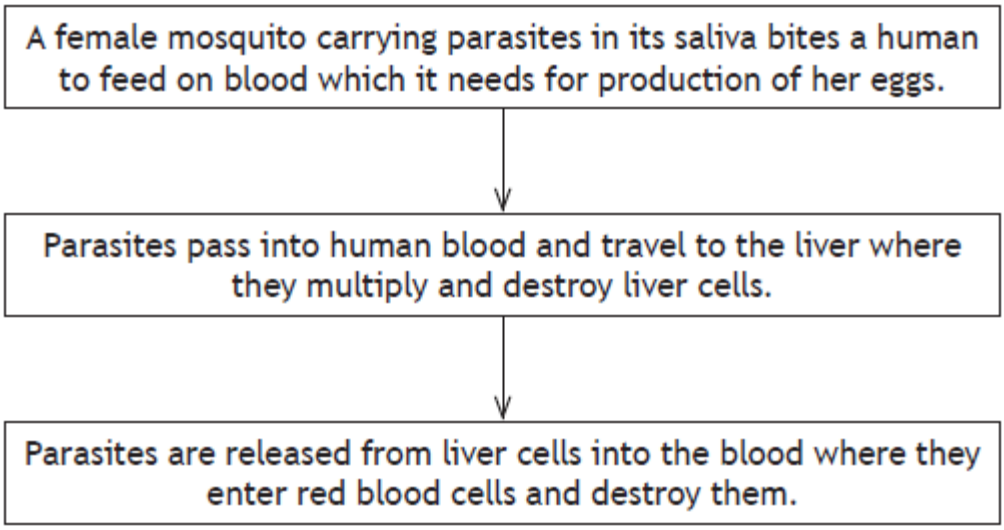
i. Briefly describe the part played by diaphragm in bringing about the movement of air over the part of the graph labelled A.

_____

_____

_____ [2]

10. Malaria is a disease in humans caused by a parasite which is transmitted from human to human by mosquitoes. The stages of infection in humans are shown in the flow diagram below.



a) i. Identify the vector in this parasitic relationship. _____ [1]

ii. Give a reason why only female mosquitoes transmit the malaria parasite.

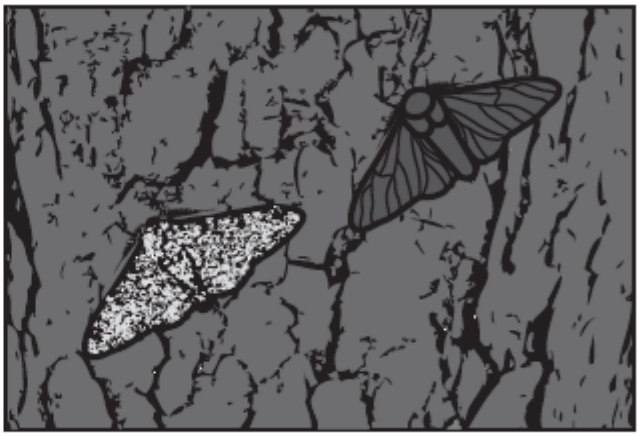
_____

_____ [2]

11. The diagrams below show the light and dark varieties of a moth which can be found in woodland areas. These moths rest on the bark of trees during the day and can be eaten by birds. Normally the bark of trees in the woodland is light coloured. However in industrial areas, pollutants cause the tree bark to darken.

Woodland area

Industrial area



a) The dark variety of the moth is the result of a random change in the genetic information.
State the term used to describe this change. _____ [1]

b) An investigation into the population of these moths in a woodland was carried out. The moths were captured, marked and released. 24 hours later the moths were recaptured. The results are shown in the following table.

Variety of moth	*Number of moths marked and released*	*Number of marked moths recaptured*	*Marked moths recaptured (%)*
Light	480	264	55
Dark	520	208	40

i. Suggest a reason why the number of the marked moths recaptured was worked out as a percentage.

_____

_____ [2]

ii. The woodland was in a non-industrial area. Explain why the percentage of light moths recaptured was higher than dark moths.

_____

_____ [2]

iii. Name the process which results in the better adapted variety of moth being more likely to survive and reproduce.

_____ [1]

SECTION C: ESSAYS

12. Discuss the dependence of humans on forests

[10]

13. The mode of transmission of a disease determines how people try to prevent it.
Discuss this statement by referring to Cholera, Malaria and ringworm

[10]

END OF QUESTIONS