

Nama: .....

Kelas: .....

**SULIT**  
**4551/2**  
**Biologi**  
**Kertas 2**  
**September**  
**2005**

4551/2



2½ jam

**MAKTAB RENDAH SAINS MARA**

**PEPERIKSAAN PERCUBAAN**  
**SIJIL PELAJARAN MALAYSIA 2005**

**BIOLOGI**

Kertas 2

Dua jam tiga puluh minit

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. *Tuliskan nama dan kelas anda pada ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan di halaman kiri adalah dalam bahasa Melayu. Soalan di halaman kanan adalah yang sepadan dalam bahasa Inggeris.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Melayu atau bahasa Inggeris.*
5. *Calon dikehendaki membaca maklumat di halaman 2 atau halaman 3.*

<i>Untuk Kegunaan Pemeriksa</i>			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	10	
	2	10	
	3	10	
	4	10	
	5	10	
B	1	20	
	2	20	
C	3	20	
	4	20	
Jumlah			

Kertas soalan ini mengandungi 58 halaman bercetak dan 2 halaman tidak bercetak

**INFORMATION FOR CANDIDATES**

1. *This question paper consists of three sections: **Section A**, **Section B** and **Section C**.*
2. *Answer **all** questions in Section A. Write your answers for Section A in the spaces provided in the question paper.*
3. *Answer one question from Section B and one question from Section C. Write your answers for Section B and Section C on the lined pages provided at the end of this question paper. Answer questions in Section B and Section C in detail. Answers should be clear and logical. Equations, diagrams, graphs and other suitable methods can be used to explain your answer.*
4. *The diagrams in the questions provided are not drawn to scale unless stated*
5. *The marks allocated for each question and sub-section of a question is shown in the brackets.*
6. *If you wish to change or cancel any answer, neatly cross out the answer.*
7. *You may use non-programmable scientific calculator. However, steps in calculation must be shown.*
8. *The time suggested to complete **Section A** is 40 minutes, **Section B** is 30 minutes and **Section C** is 30 minutes.*
9. *Hand in all your answers at the end of the examination.*

**Section A**

[60 marks]

Answer **all** questions

*The time suggested to complete this section is 90 minutes.*

*For  
Examiner's  
Use*

**1** Figure 1.1 shows phases M and N during meiosis 1.

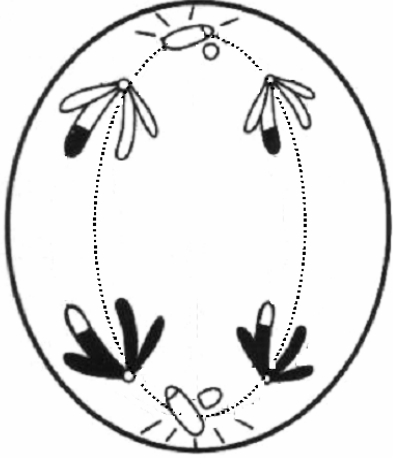
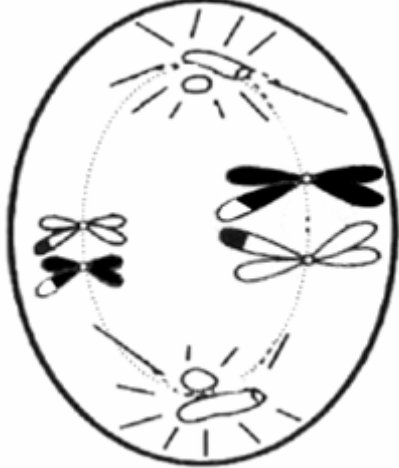
	
<p>Phase M: _____</p>	<p>Phase N: _____</p>
<p>Description:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p>Description:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>

FIGURE 1.1

(a) In the space provided:

(i) Name phases M and N.

[2 marks]

(ii) Describe the behaviour of the chromosomes during both phases.

[2 marks]

1(a)(i)

1(a)(ii)

(b) Figure 1.2 shows the behaviour of chromosomes during prophase 1.

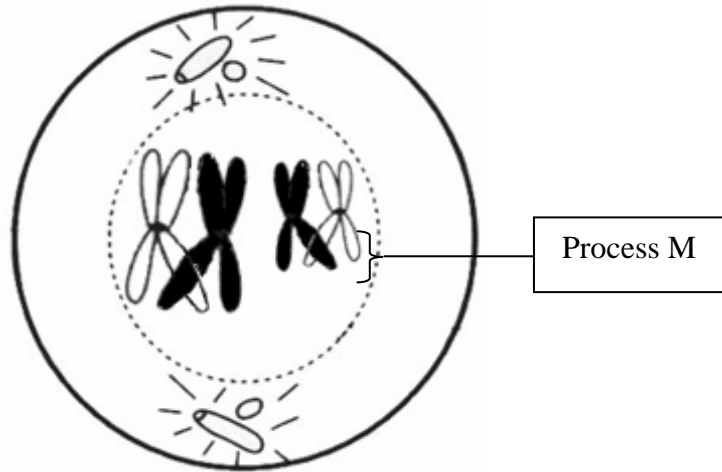


FIGURE 1.2

(i) Name process M.

.....  
[1 mark]

1(b)(i)

(iii) Name the part of the chromatid where process M takes place.

.....  
[1 mark]

1(b)(ii)

(c) Based on Figure 1.2, draw the chromosome during prophase II.



2 marks]

1(b)(iii)

For  
Examiner's  
Only

(d)

Statement:

Meiosis is a process whereby gametes are formed in the sexual reproductive organs.

Situation:

The offspring borne in a family are diverse in their appearance.

Based on the statement given, explain how the above situation can occur .

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[3 marks]

1 (d)

(e)

Figure 1.3 shows the formation of cancer cells in the human epithelium .

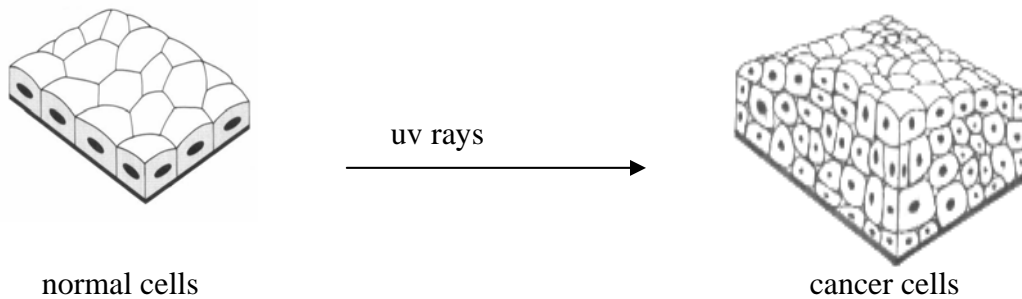


FIGURE 1.3

Based on Figure 1.3 above, explain how cancer develops .

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[2 marks]

1(e)

**Total**

2 Figure 2.1 shows 4 groups of food necessary for a balanced diet.

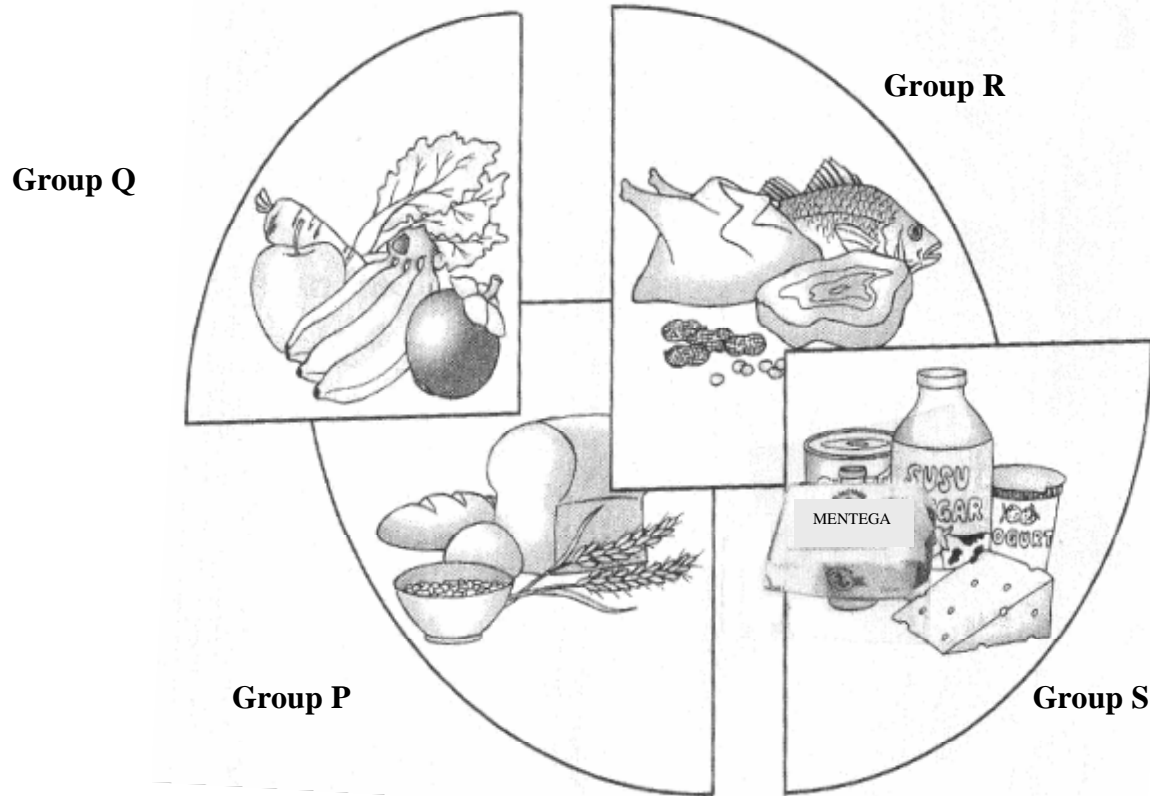


FIGURE 2.1

(a) (i) State the food class represented by group P.

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[1 mark]

2(a)(i)

(ii) State the main function of food from group P.

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[1 mark]

2(a)(ii)

(b) Explain why a pregnant mother needs nutrition from group R.

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[2 marks]

2(b)

(c) State the effect of the following on a child :

(i) lack of food from group Q.

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(ii) excess food from group S .

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[2 marks]

2(c)(i)(ii)

(d) Table 2.1 shows the types of foods from groups P and S and the amount of energy contained in every 100 grams of food.

Type of food (100g)	Energy (KJ)
Milk	274
Egg	612
Bread	1025
Rice	1531
Butter	3006

TABLE 2.1

If a student has takes in 150 g milk, 100 g bread and 80 g eggs for breakfast, calculate the amount of energy obtained from the food.

[2 marks]

2(d)

For  
Examiner's  
Only

- (e) (i) An individual who has osteoporosis takes food from groups P, Q, R and S in an unbalanced quantity.  
Suggest how you would advise the individual to overcome his condition.

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[2 marks]

2(e)(i)

(ii)

In a study, more women above 40 years suffer from osteoporosis compared to men.

Explain the statement above.

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[2 marks]

2(e)(ii)

**Total**



3 Figure 3.1 shows the structure of a fish.

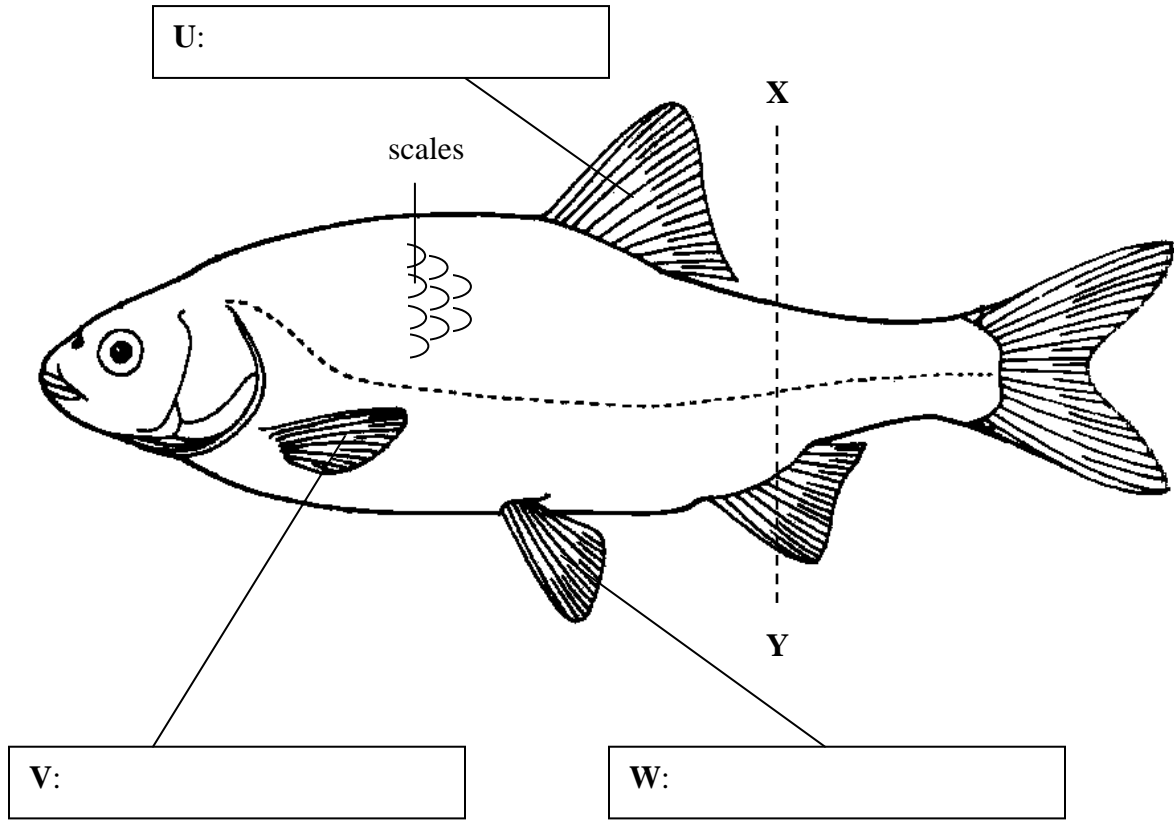


FIGURE 3.1

(a) (i) Label structures U, V and W in the space provided.

[1 mark]

3(a)(i)

(ii) State the function of scales in a fish.

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[1 mark]

3(a)(ii)

- (b) Figure 3.2 shows a cross section of myotome muscles through X---Y of a fish (Figure 3.1) as it swims in a particular direction.

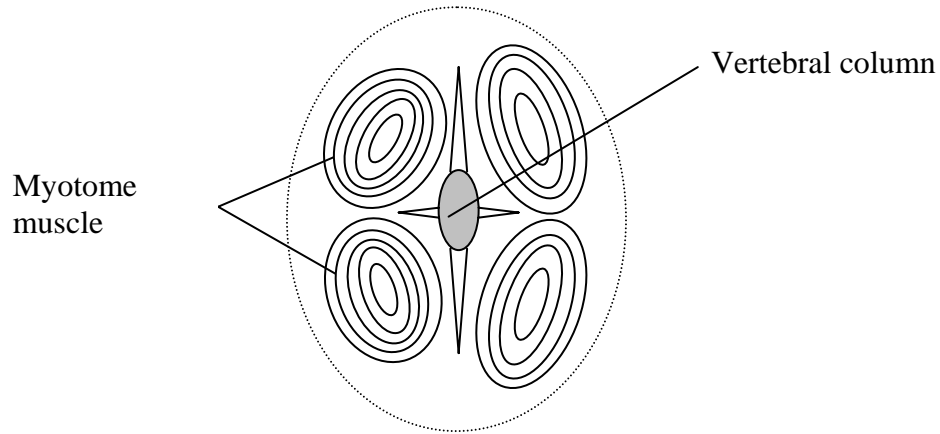


FIGURE 3.2

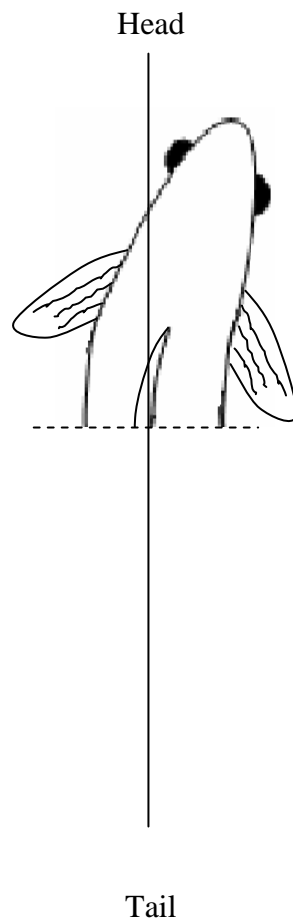


FIGURE 3.3

For  
Examiner's  
Only  
3(b)(i)

Based on Figure 3.2

- (i) Complete the tail section of the fish in its correct position and show the thrust with the arrow(→).

[2 marks]

- (ii) State how myotome muscles help the fish move in water.

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[2 marks]

3(b)(ii)

- (c) Figure 3.4 shows the attachment of muscles in a bird's wings.

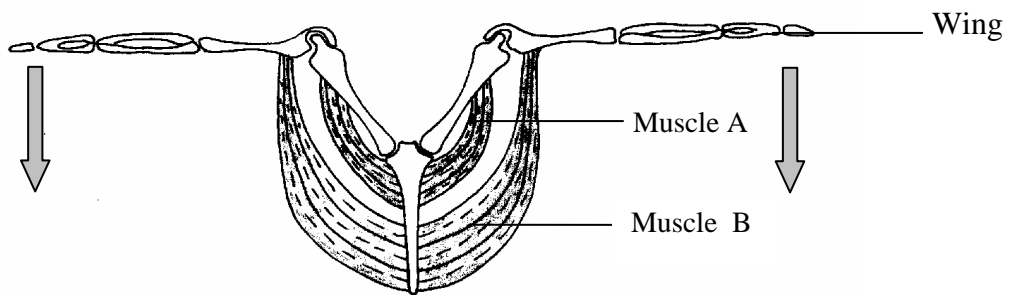


FIGURE 3.4

Based on Figure 3.4, state how the action of muscles A and B allows the wings to be pulled downwards.

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[1 mark]

3(c)

For  
Examiner's  
Only

(d) State one similarity and one difference between the muscles that aid movement in the fish in Figure 3.2 and the bird in Figure 3.4.

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[2 marks]

3(d)

(f) You are required to make a model of a bird. The following materials are provided to represent the various parts of the bird's body.

Plastic bottle	-	represents the body
Alumunium tin foil	-	represents wings
Rubber band	-	represents muscles
Ice-cream stick	-	represents bones/skeleton

Explain the relationship between the materials representing the different body parts and the characteristics of its adaptations.

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[3 marks]

3(e)

**Total**

- 4 Figure 4.1 shows a group of generation F2 fruit flies (*Drosophila* sp) as a result of self fertilization of generation F1 flies.

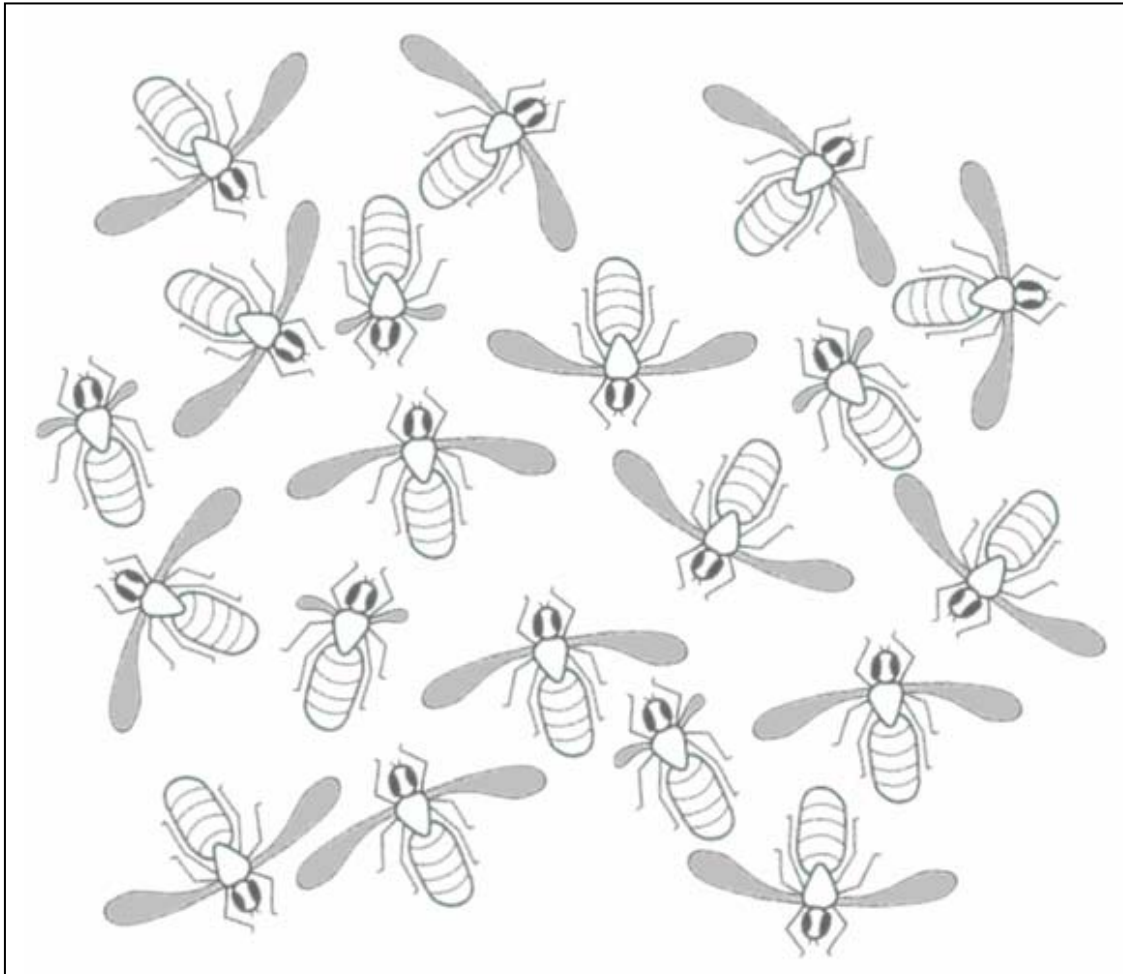


FIGURE 4.1

- (a) (i) State 2 different characteristics of the trait observed in the fruit flies in Figure 4.1.

Characteristic 1: .....

Characteristic 2: .....

[2 marks]

4(a)(i)

- (ii) Based on your observation in (a) (i) above, state the dominant and recessive characteristics of the fruit fly.

Dominant characteristics : .....

Recessive characteristics : .....

[2 marks]

4(a)(ii)

For  
Examiner's  
Only

(iii) State the ratio of dominant to recessive characteristics of the fruit fly.

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[1 mark]

4(a)(iii)

(b) What type of variation do the fruit flies show ?

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[1 mark]

4(b)

(c) By using symbol Q for dominant genes and q for recessive genes, build a schematic diagram showing generation F2 as a result of self fertilization amongst generation F1.

4(c)

[2 marks]

[2 marks]

- (d) In a study, F1 generation fruit flies with red eyes and black bodies were self fertilized. Generation F2 produced are shown in Table 5.1.

<b>Characteristic</b>	<b>Number</b>
Red eyes, black bodies	111
Red eyes, grey bodies	40
Brown eyes, black bodies	32
Brown eyes, grey bodies	17

TABLE 5.1

Based on your knowledge of genetics, explain why the above results are obtained.

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[2 marks]

4(d)

Total

5. Figure 5 shows the hormones produced by the pituitary glands and its relationship with the endocrine glands and certain targeted organs.

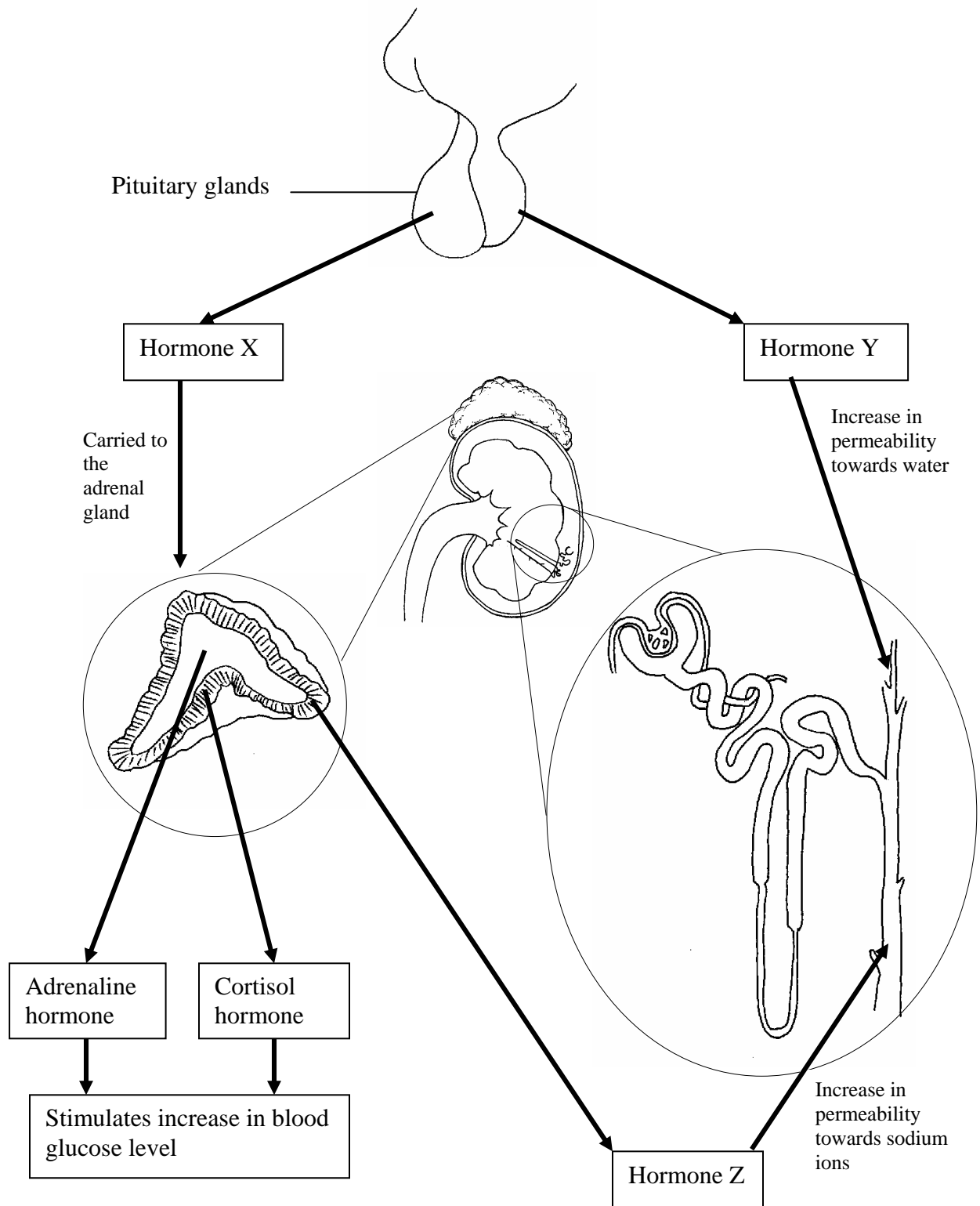


FIGURE 5



(a) Based on figure 5 name hormone X and state its function.

Hormone X : -----

Function : -----

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[2 marks]

5(a)

(b) Referring to Figure 5, explain how the pituitary and adrenal glands control blood osmotic pressure.

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[2 marks]

5(b)

(c) Explain how the adrenaline and cortisol hormones play a part when the body is in a stressful situation.

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[3 marks]

5(c)

(d)

An individual who was born normal suffers from stunted growth.

Explain why the individual suffers from this problem.

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[2 marks]

5 (d)

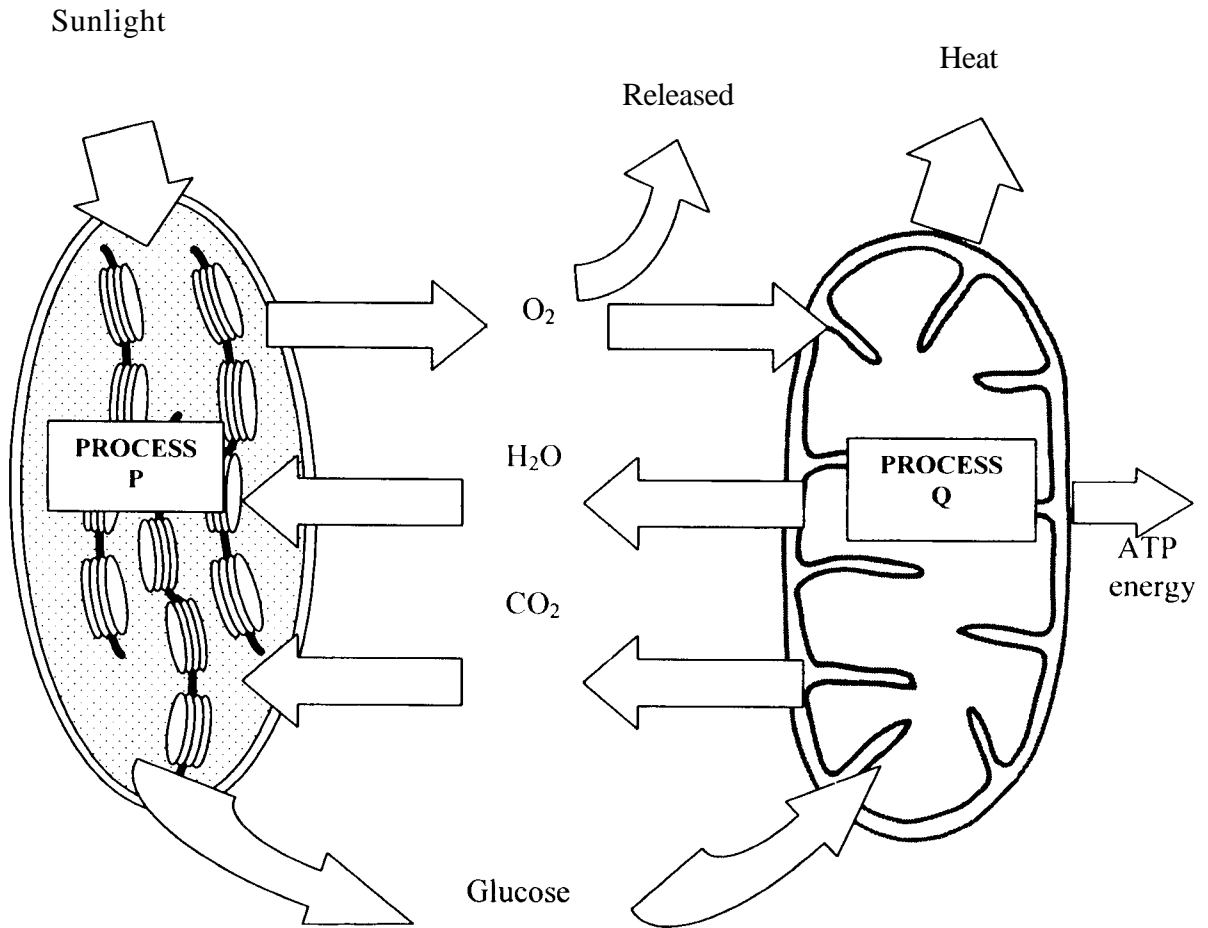
**Total**

**Section B** [20 marks]

Answer any **one** question from this part.

*Time suggested to answer this part is 30 minutes.*

- I (a) Figure 6 shows processes P and Q that takes place in two different organelles in the mesophyll palisade cells.



RAJAH 6

Explain what happens during processes P and Q.

[4 marks ]

(b)

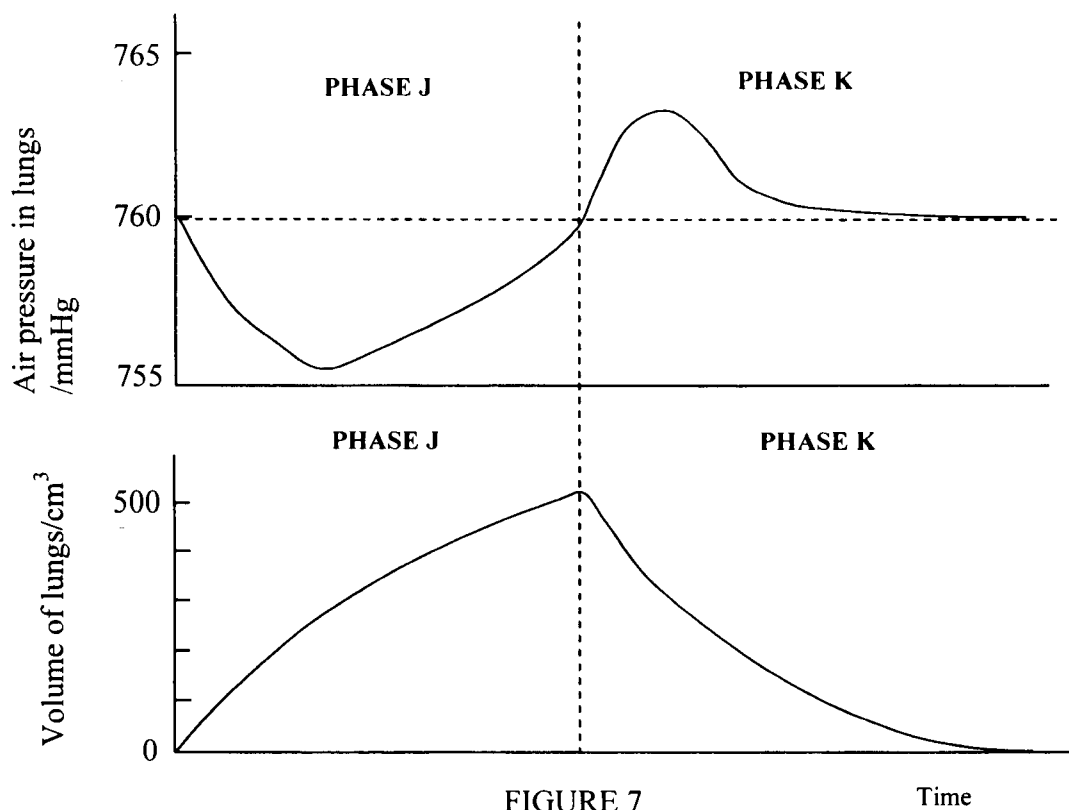
A woman is walking towards a supermarket. Suddenly a man approaches her and grabs her handbag and runs away. In a state of shock the woman shouts while running after the snatch thief. After a while, the woman feels as below:

- The rate of heart beat increases
- Thirsty
- Tired

Based on the statements above, explain why the situation happened to the woman. [ 6 marks]

(d)

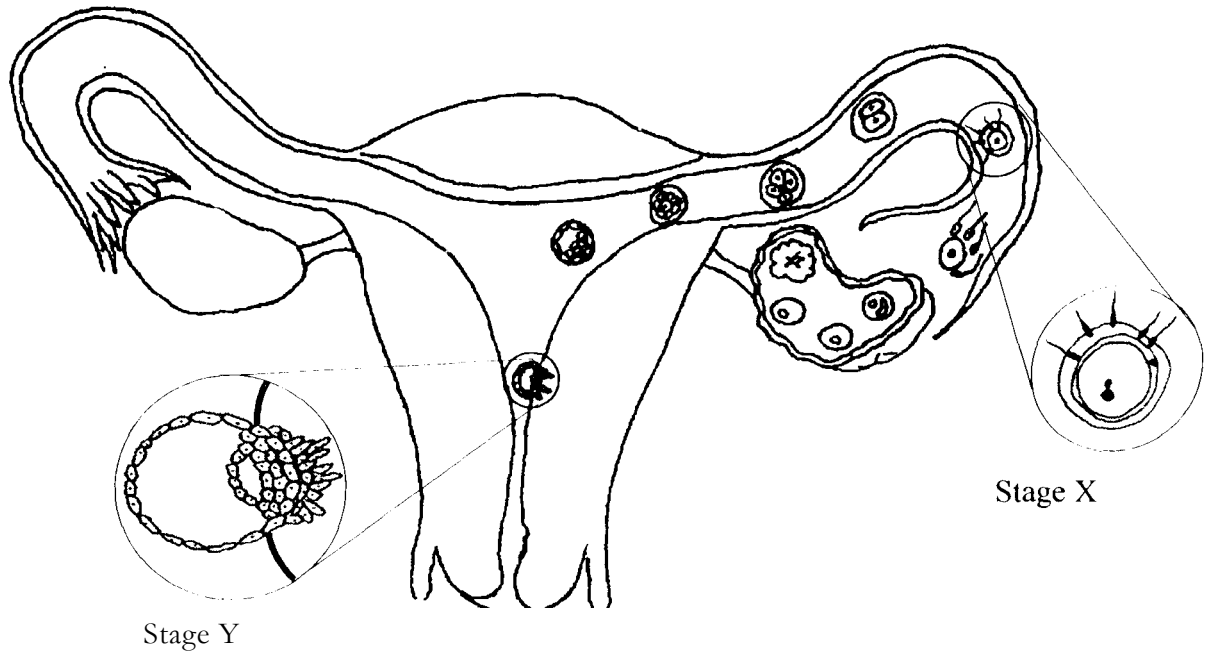
Figure 7 shows the respiration mechanism that involves the air pressure and the volume of air in the lungs during phases J and K.



Referring to Figure 7, explain the differences in the respiration mechanism during phases J and K.

[10 markah]

- 2 (a) Figure 8 shows the stages of prenatal development in humans.



**FIGURE 8**

Explain the process which happens during :

- i) stage X
- ii) stage Y

*[4 marks]*

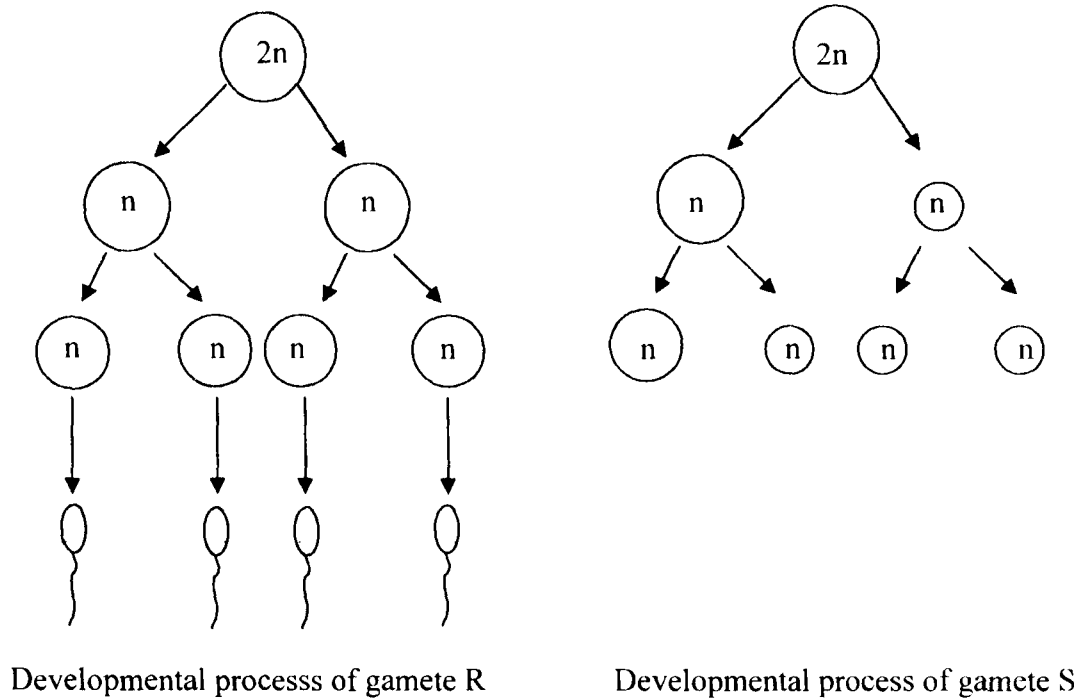
- (b) A 50 year old woman has been advised by the doctor to take the following steps:

- Undergo hormone therapy treatment
- To go on a high calcium diet
- To avoid fatty foods

Explain why the woman should heed the doctor's advice.

*[6 marks]*

(c) Figure 9 shows the developmental process of gamete R and gamete S in humans.



**FIGURE 9**

Based on Figure 9 and your knowledge of biology, explain the differences between the developmental processes of gamete R and gamete S.

*[10 marks]*

**Section C**

[20 marks]

*Answer any **one** question from this section.*

*The time suggested to answer this section is 30 minutes..*

3 Figure 10 shows a glass house.

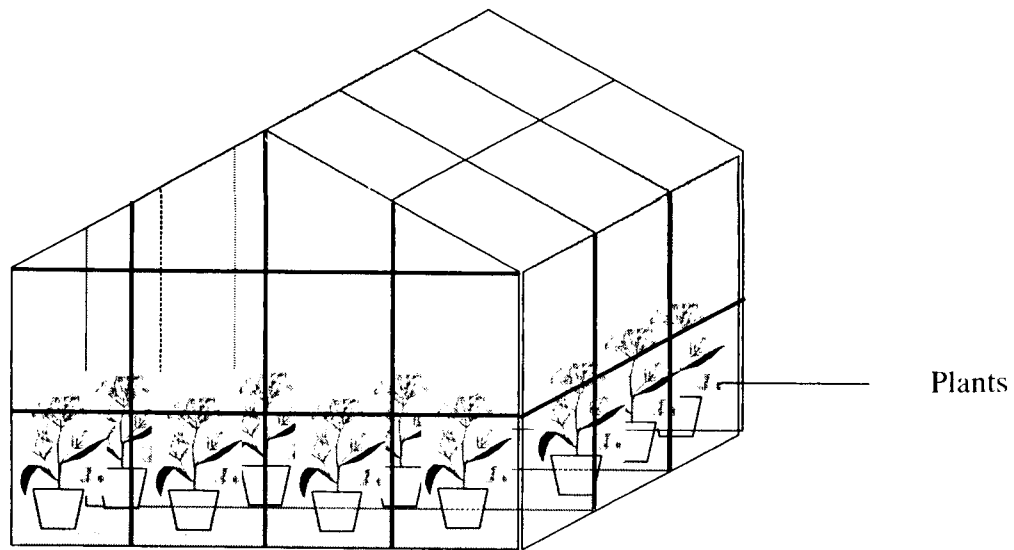


FIGURE 10

(a) Based on your knowledge of biology concerning factors affecting the process of photosynthesis, explain how the usage of the glass house can increase the production of agricultural products.

[10 marks]

(b) Figure 11 shows organism T and organism U.

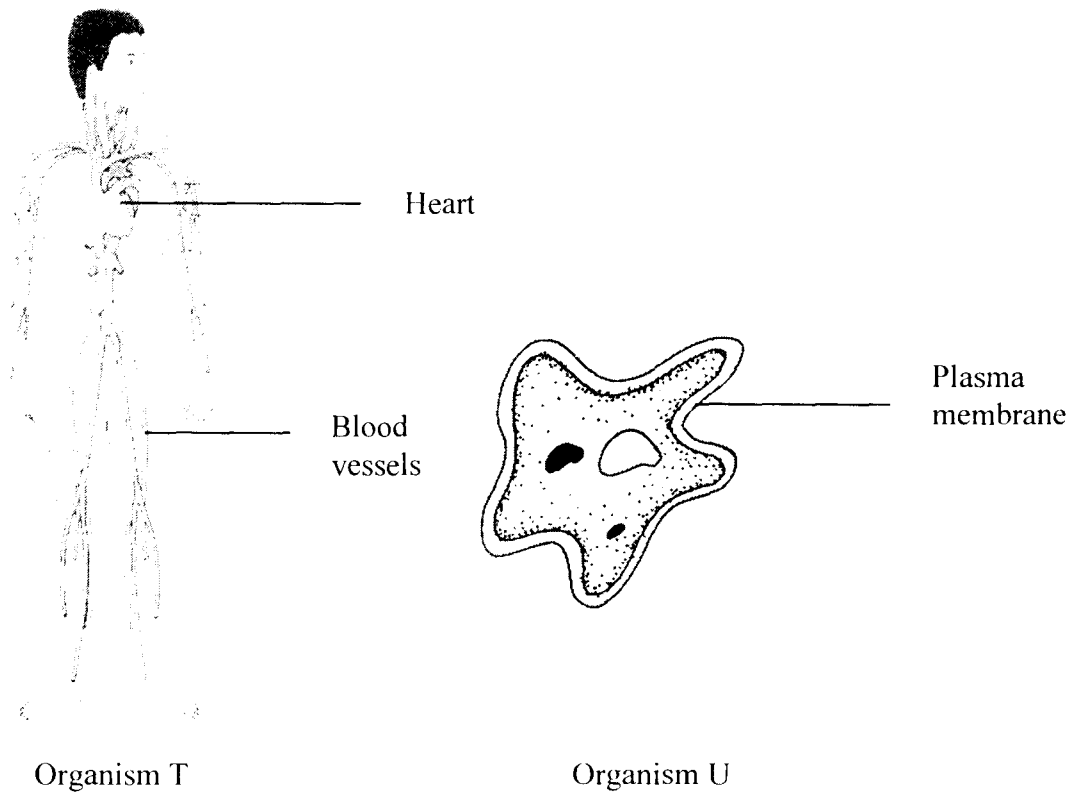


FIGURE 11

Based on your knowledge of biology, state your arguments on why organism T needs a complex transport system to fulfill its basic needs while organism U does not need a complex transport system.

*[10 marks]*



4 (a) Figure 12 show-, a river ecosystem,

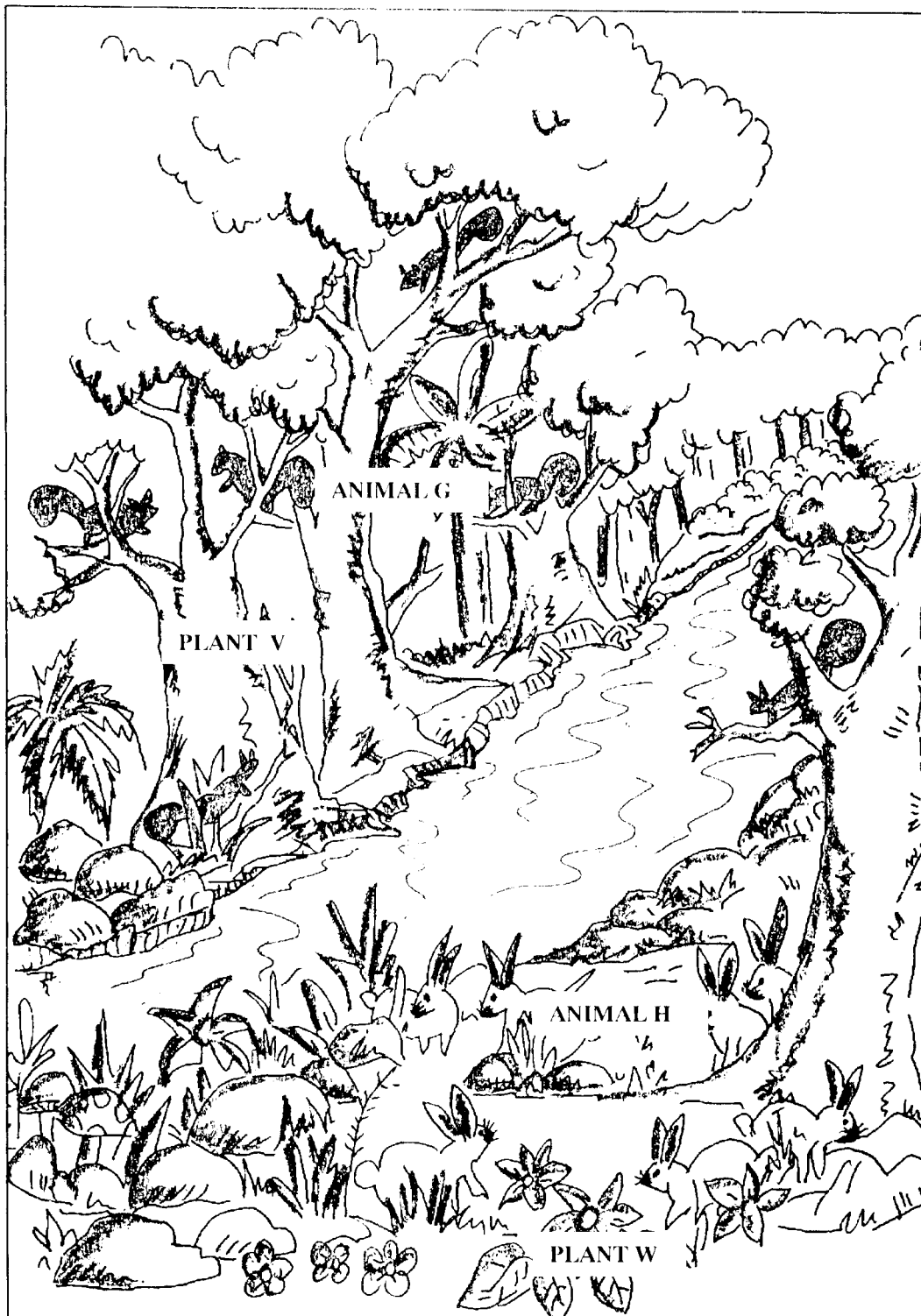


FIGURE. 12

Suggest the steps that can be taken to estimate the population size of any **one** animal and any **one** plant in the ecosystem.

[10 marks]

(c) Figure 13 shows various human activities in an area..

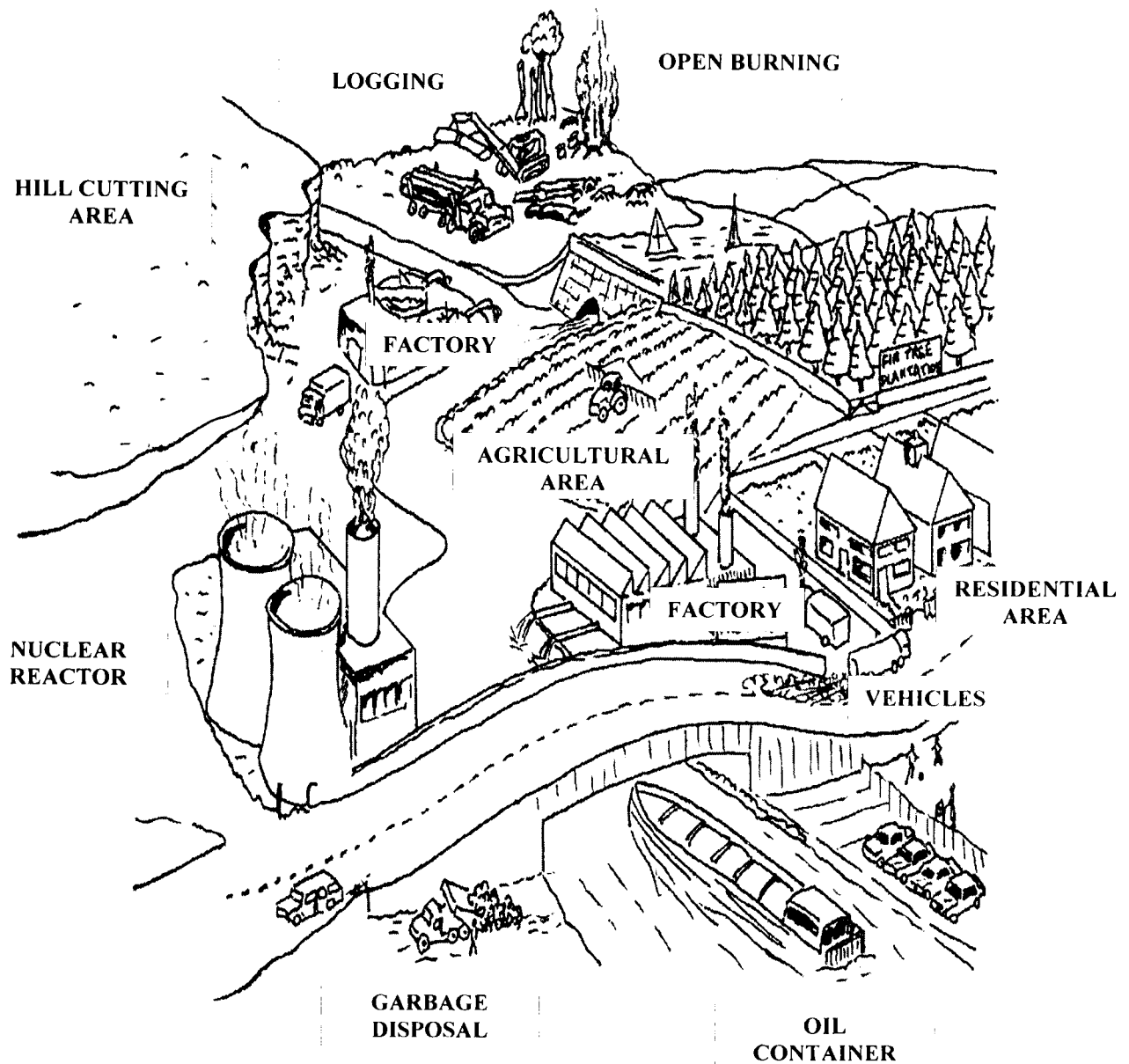


FIGURE 13

Based on your knowledge of biology, explain how the effects of the activities stated could be reduced by the usage of technology and the preservation of natural resources.

[10 marks]

END OF QUESTION PAPER