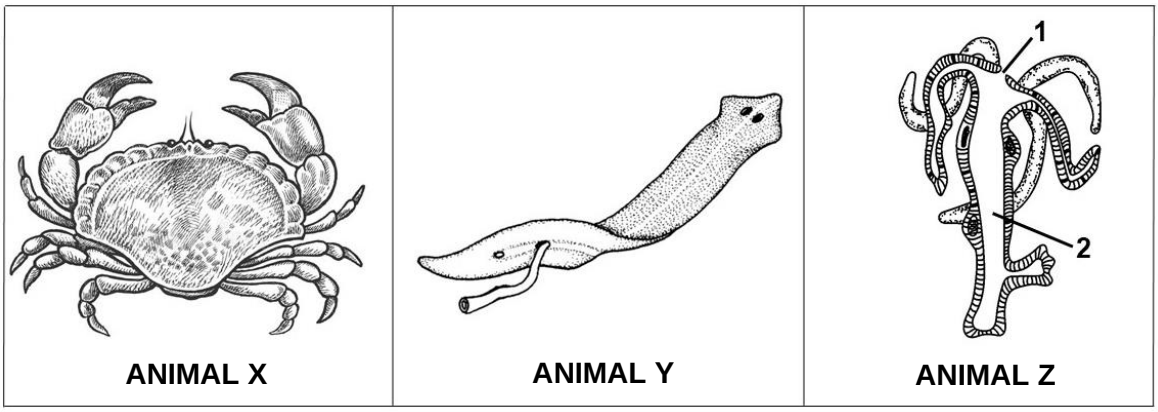
ANIMAL DIVERSITY

1.4 The diagrams below show three different types of animals that belong to three different phyla. Study the diagrams and answer the questions that follow.



ANIMAL X | **ANIMAL Y** | **ANIMAL Z**

1.4.1 Identify the different phyla to which animals **X**, **Y** and **Z** belong. (3)

1.4.2 Arrange the organisms in the correct order from the most primitive to the most developed. Write the **LETTERS** only. (1)

1.4.3 Identify label **2**. (1)

1.4.4 Which organism(s) has/have the following characteristics?

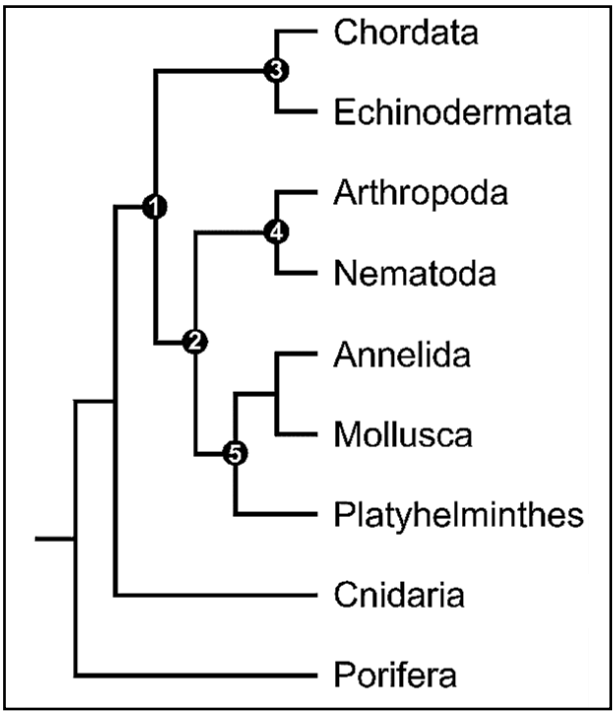
(a) Diploblastic (1)

(b) Cephalisation (1)

(c) Radial symmetry (1)

1.4.5 How does organism **Y** feed? (1)
(9)

1.5 The phylogenetic tree below shows evolutionary relationships between different animal phyla. The numbers 1 to 5 on the diagram represent die development of certain bodily characteristics or shared ancestors. Study the diagram and answer the questions that follow.



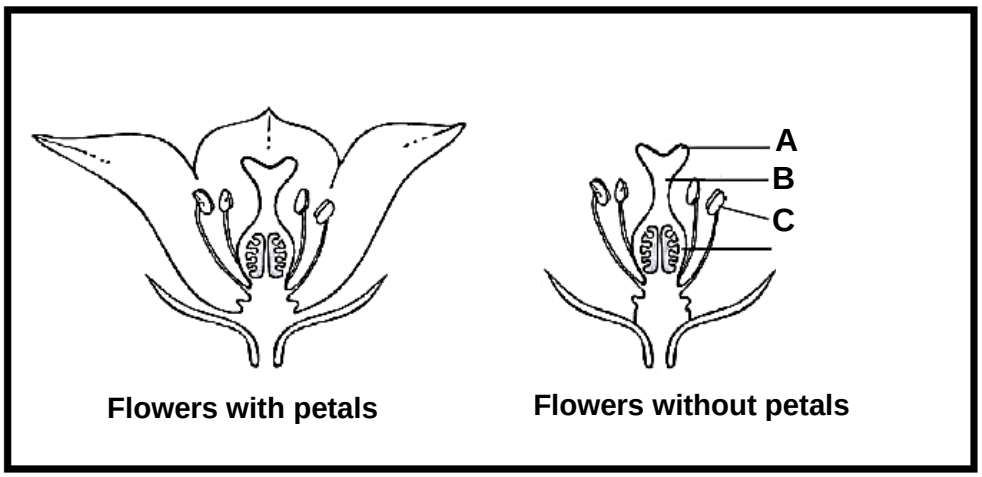
1.5.1 Which **NUMBER** on the diagram represents:

(a) the development of bilateral symmetry? (1)

(b) the most recent common ancestor of Arthropoda and Platyhelminthes? (1)

1.5.2 Draw a simplified diagram to show a cross section through the body plan of a triploblastic animal. Give labels to each tissue layer. (3)
(5)

2.2 An investigation was done to determine the role of petals in insect pollination of apple flowers. Ten flowers with petals and ten flowers without petals were used. After two days, the flowers were prevented from further pollination. After seven days the extent of pollination and fertilisation were recorded. The diagrams below show the appearance of the flowers with and without petals.



The results of the investigation are shown in the table below:

	NUMBER	
	Flowers with petals	**Flowers without petals**
Pollen on part **A**	158	25
Ovules fertilised	38	4

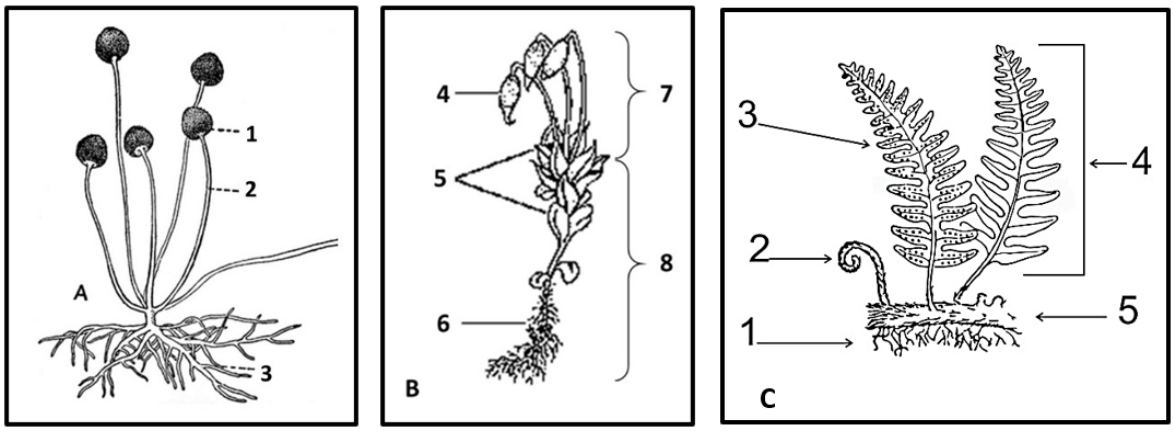
2.2.1 What is the independent variable in this investigation? (1)

2.2.2 Explain the presence of more pollen on part **A** of the flowers with petals than on part **A** of the flowers without petals. (2)

2.2.3 If this were a wind-pollinated flower, how would structures **A** and **C** be adapted differently? (2)

2.2.4 With reference to structure **C**, explain why this flower is most likely not a self-pollinating flower. (2)
(7)

2.3 Study the organisms A, B and C below. Answer the questions that follow.



2.3.1 Identify the organisms **A** and **B** respectively. (2)

2.3.2 Identify the asexual reproductive structures that are produced by all three organisms. (1)

2.3.3 In terms of habitat, what do all three of these organisms have in common? (1)

2.3.4 Describe **ONE** difference between the functions of the structures **3 (Diagram A)** and **6 (Diagram B).** (2)

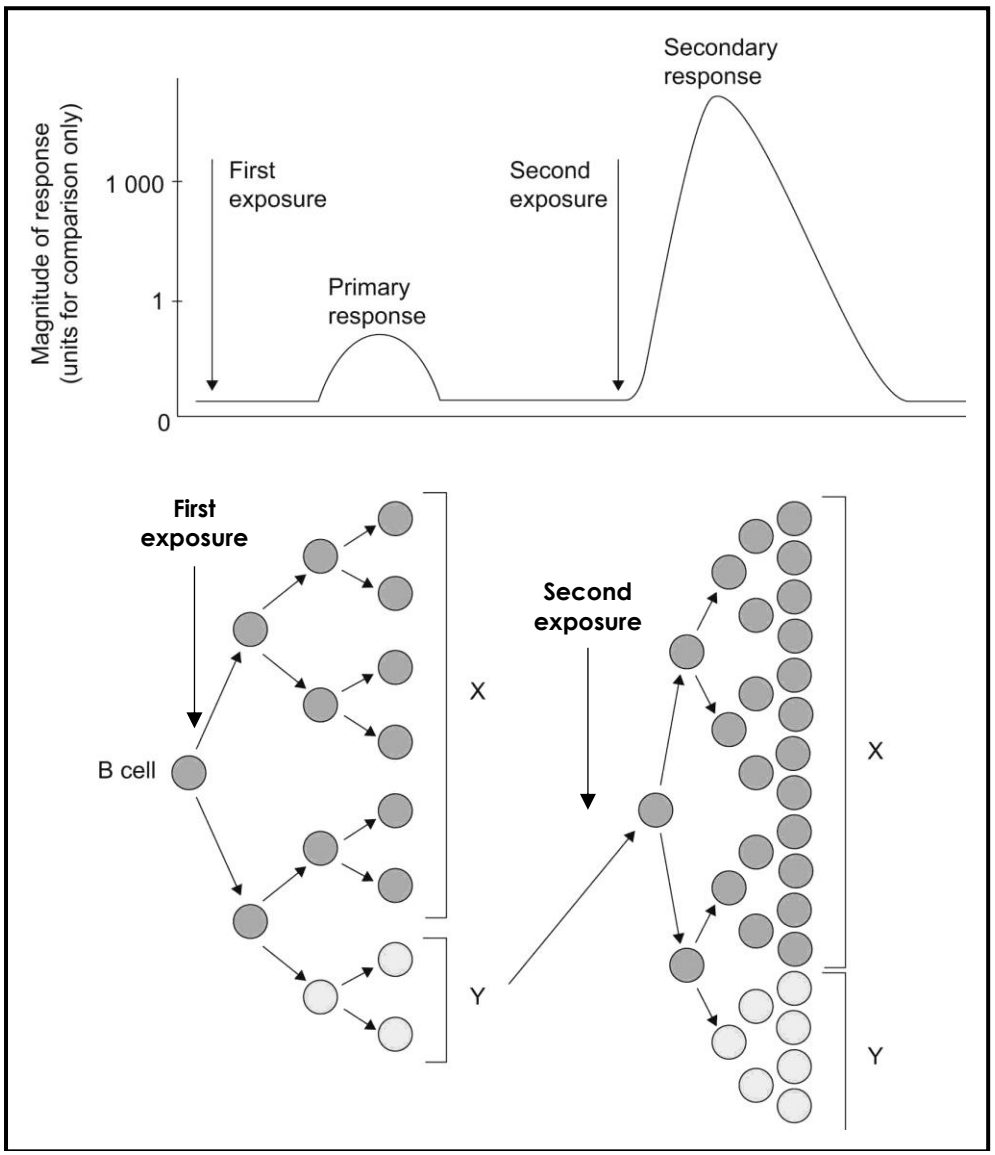
2.3.5 Which process occurs inside structure **4** to cause generation alteration? (1)

2.3.6 Is structure **7** diploid or haploid? (1)

2.3.7 To which plant division does organism **C** belong? (1)

2.3.8 Briefly discuss the life cycle of organism **B**. (5)
(14)

2.4 The diagram below illustrates what happens during the immune response.



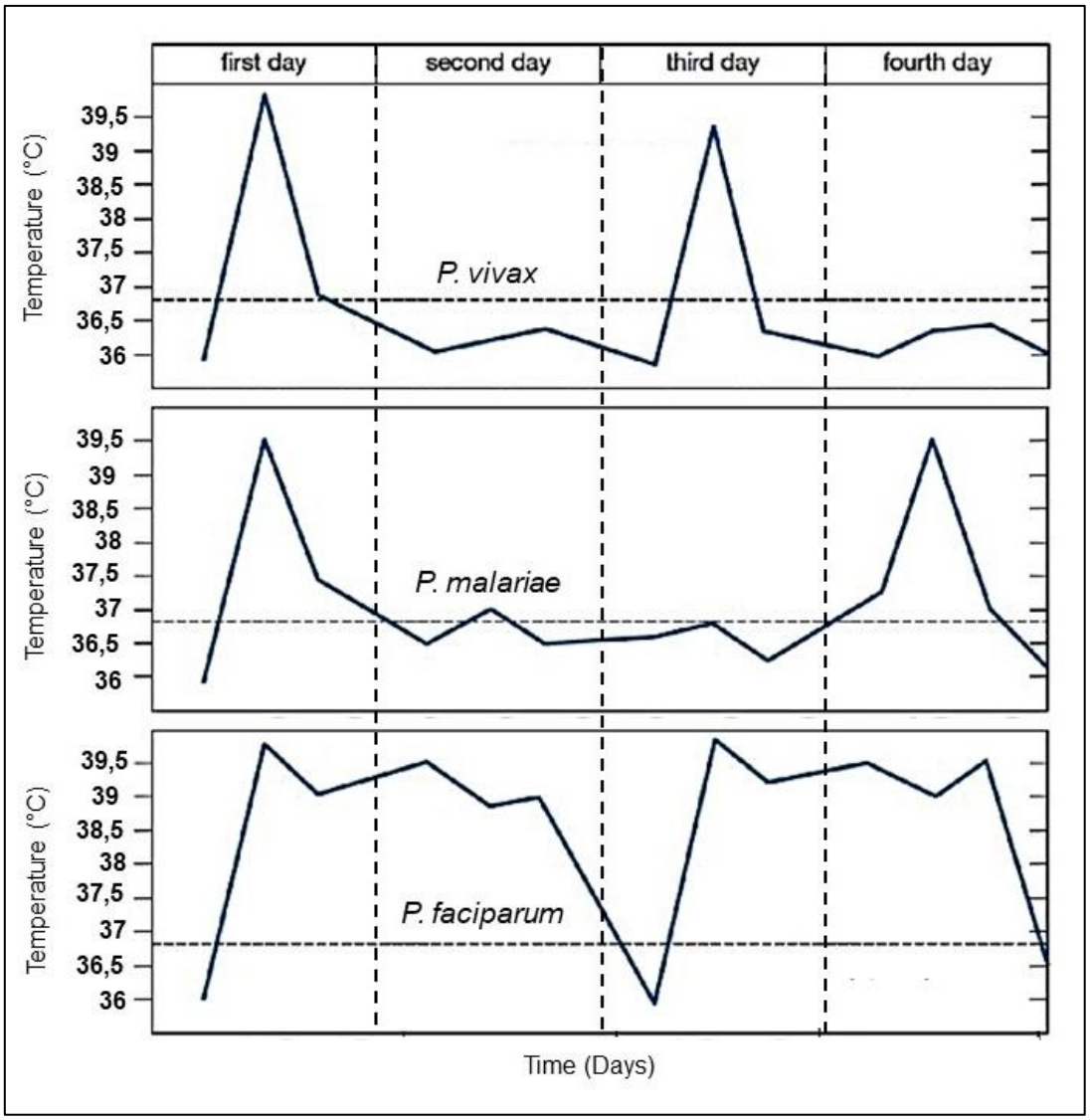
2.4.1 What type of blood cells are B-cells? (1)

2.4.2 Identify the cells **X** and **Y** respectively. (2)

2.4.3 Explain what antibodies are as well as what their function is. (3)

2.4.4 Use the information in the diagram to explain why the immune response differs when someone is exposed to an antigen for the first time, compared to the second time. (4)
(10)

2.5 The graphs below show the course of infection and fever attacks experienced during Malaria. Three different species of malaria parasites are shown. Each species of malaria parasite causes a different course of infection and fever attack frequency. Study the graphs and answer the questions that follow.



2.5.1 Fever is part of the inflammatory response that is started by a certain type of white blood cell. Identify the type of white blood cell that is referred to here and describe how these cells initiate the inflammatory response. (2)

2.5.2 Three species of malaria parasites are shown: *P. vivax, P. malariae* and *P. faciparum*. What does the *P*. in the organism's name stand for? (1)

2.5.3 If day one on the graph is the 20th November 2020, give the date of the next fever attack that will be caused by *P. malariae*. (1)

2.5.4 For the three malaria parasite species shown, give the **NAME** of the one that will most likely be the most dangerous for a patient to contract. (1)

2.5.5 Explain your answer in **QUESTION 2.5.4** by using the information given in the graphs, as well as your knowledge about the dangers of fever in the body. (3)

2.5.6 One of the most recent ways to control malaria infections involves creating sterile male mosquitos through genetic manipulation.

(a) Give the **NAME** of the species mosquito that will most likely be the target for this type of treatment. (1)

(b) Explain how sterile male mosquitos will affect the number of malaria cases. (3)

(12)

1.4 1.4.1 X - Arthropoda✓
Y - Platyhelminthes✓
Z - Cnidaria✓ (3)

1.4.2 Z → Y → X✓ (all or nothing) (1)

1.4.3 Coelenteron✓ (1)

1.4.4 (a) Z✓ (1)

(b) X and Y✓ (both must be mentioned) (1)

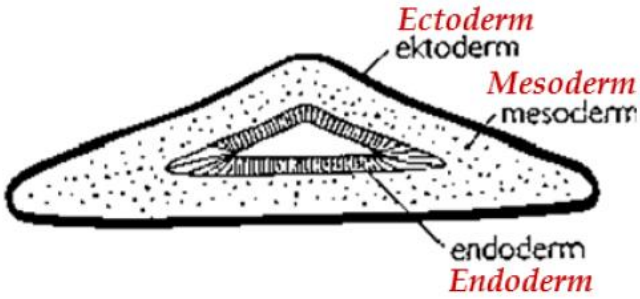
(c) Z✓ (1)

1.4.5 Absorbs nutrients over its entire body ✓
OR
Through diffusion✓ from the environment (1)
(9)

1.5 1.5.1 (a) 1✓ (1)

(b) 2✓ (1)

1.5.2



✓ectoderm at correct place
✓endoderm at correct place
✓mesoderm at correct place (3)
(5)

2.2 2.2.1 The presence / absence of petals✓ (1)

2.2.2 The flowers with petals attract more insects for pollination than the flowers without petals✓✓ / attract more pollinating agents/pollinators
OR
The flowers without petals could not attract insects for pollination✓✓/ pollinating agents /pollinators
OR
The presence of petals prevents pollen from being blown away by the wind✓✓
OR
The absence of petals causes the most pollen to be blown away by the wind✓✓ (2)

2.2.3 A – will be feather-like✓ / longer/ hang outside the flower ✓
C – elongated✓ / hangs outside the flower / produces large amounts of light pollen (2)

2.2.4 Part C (anther) is shorter / sits lower / sits below part A✓ (the stigma)
Therefore pollen will not be able to fall from the anther onto the stigma✓ (2)
(7)

2.3 2.3.1 A – Fungus / Mould / Bread mould / Rhizopus✓
B – Bryophyte / Moss plant✓ (2)

2.3.2 Spores ✓ (1)

2.3.3 Moist / Damp / Wet / Shady ✓ (1)

2.3.4 **3 (Rhizoids)** release digestive enzymes✓ to digest the substrate on which the mould it growing
6 (Rhizoids) anchor the moss plant and absorbs minerals / does not release any digestive enzymes ✓ (2)

2.3.5 Meiosis ✓ (1)

2.3.6 Diploid ✓ (1)

2.3.7 Pteridophyta ✓ (1)

2.3.8 **ANY 5 OF THE FOLLOWING:**

- Spores germinate in favourable conditions ✓
- forms a protonema ✓
- grows to the gametophyte ✓
- Contains male and female branches ✓
- The sperm cell swims through water ✓
- To the egg cells / ovum ✓
- Fertilisation leads to the development of the sporophyte ✓
- That lives semi-parasitically on the gametophyte ✓
- It produces spores in the sporangium✓
- That are released and spread through the wind ✓

(5)
(14)

2.4 2.4.1 White blood cells ✓ / Lymphocytes (1)

2.4.2 X – Antibody ✓
Y – Memory cell ✓ (2)

2.4.3 **MARK ANY THREE:**
Antibodies are **proteins**✓, that **attack/destroy/neutralise pathogens**✓
They **defend**✓ the body/ Part of the **specific immune response** ✓ (3)

2.4.4 After the first exposure: It takes longer ✓ for the body to respond and produce a few plasma cells ✓.

After the second exposure: The response is quicker and more intense✓.
Memory cells can quickly produce lots of plasma cells that produce lots of antibodies ✓ (4)
(10)

2.5 2.5.1 Mast cells✓
Release histamines✓ (2)

2.5.2 Plasmodium✓ (1)

2.5.3 26 November 2020✓ (1)

2.5.4 P. faciparum✓ (1)

2.5.5 **ANY THREE**
Causes prolonged / continueous fever / constantly elevated body temperature / fever attacks last for two days ✓
Which can denature✓
Enzymes/proteins✓ and
Cause death✓ (3)

2.5.6 (a) Anopheles✓ (1)

(b) **COMPULSORY MARK + ANY TWO OTHER FACTS**
Malaria cases will **decrease**✓*
As there are fewer fertile males to mate with the females✓
Fewer eggs will be lain / fewer mosquito larvae / lower change of fertilisation ✓
fewer new mosquitos develop ✓ (3)
(12)