Year 9 Sample Q's Plate tectonics

SECTION 1:

Multiple Choice Questions
Questions 1-20 (20 marks)
Answer these questions on the separate multiple choice answer sheet provided.

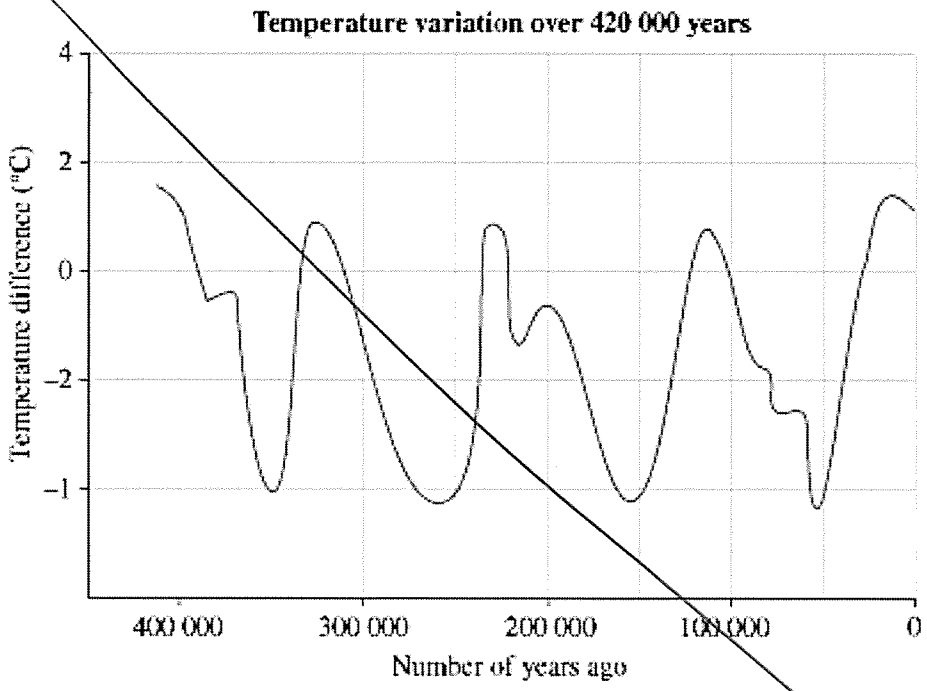
1. Which scientific theory describes the *movement* of the continents?

(A) creationism
(B) plate tectonics
(C) the Big Bang theory
(D) the theory of Evolution

2. Which is the best explanation of the global warming?

(A) A decrease in carbon dioxide in the atmosphere traps more heat and allows more ultraviolet radiation to reach Earth's surface.
(B) An increase in the ozone layer decreases the amount of ultraviolet radiation that reaches Earth's surface.
(C) A decrease in the ozone layer allows more radiation to reach Earth's surface.
(D) An increase in carbon dioxide in the atmosphere traps more heat radiation from Earth.

3. Looking at the graph below, how long does the Earth's temperature take to complete a full warming and cooling cycle?



(A) Approximately every 50 000 years
(B) Approximately every 100 000 years
(C) Approximately every 20 000 years
(D) Approximately every 200 000 years

4. Where is an earthquake likely to occur?

(A) At plate boundaries where plates slide past each other
(B) At the weak points in the Earth's crust
(C) At plate boundaries where plates push against each other
(D) All of the above

5. Why can a mutation be an advantage for populations of living things?

(A) It always makes organisms more disease-resistant.
(B) It causes new structures to develop in individuals.
(C) It creates variations in the characteristics of organisms.
(D) It makes cells in an individual work and divide faster.

6. What term is used to describe the parts of pathogens that trigger your immune system?

(A) Antigens
(B) Antibodies
(C) Platelets
(D) Neurotransmitters

7. What term is given to describe the variable that is deliberately changed during an experiment?

(A) Dependent
(B) Independent
(C) Controlled
(D) Control

8. What term is used to describe the range of genetic traits within a species?

(A) Species diversity
(B) Genetic diversity
(C) Genetic drift
(D) Species genotype

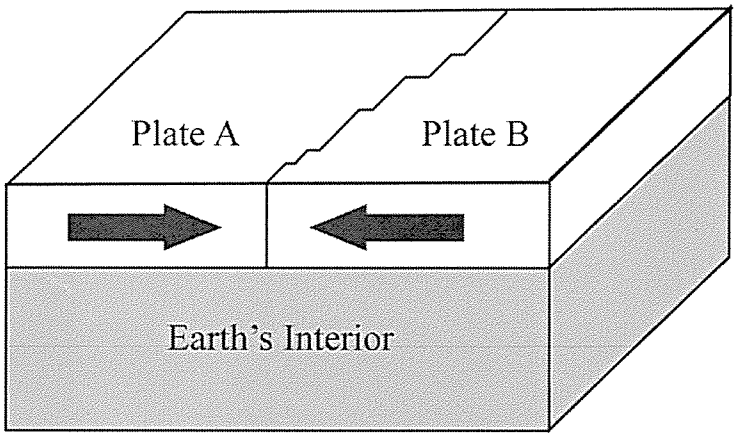
9. The Doppler Effect can be used to measure the direction of movement in space. This is because:

(A) Stars moving away from us cause a Blue Shift
(B) Stars moving away from us cause a Red Shift
(C) Stars moving towards us cause an absence of light (Black Hole)
(D) Stars moving towards us cause a Green Shift

10. A population is a group of individuals of the same species. According to the theory of natural selection, what is likely to happen to a population when a change occurs in it's environment?

(A) The individuals that have traits better suited to the changed environment would be more likely to survive and reproduce than those with less suitable traits
(B) All of the individuals would try to develop new traits so they could survive and reproduce in the changed environment.
(C) Some of the individuals would try to develop new traits so they could survive and reproduce in the changed environment.
(D) Because all the individual of the same species have the same traits, one individual would never have an advantage over another in it's population. They would either all survive or die.

11. Plate A and Plate B are both made of continental plate material where they touch. What will happen when the plates press together?



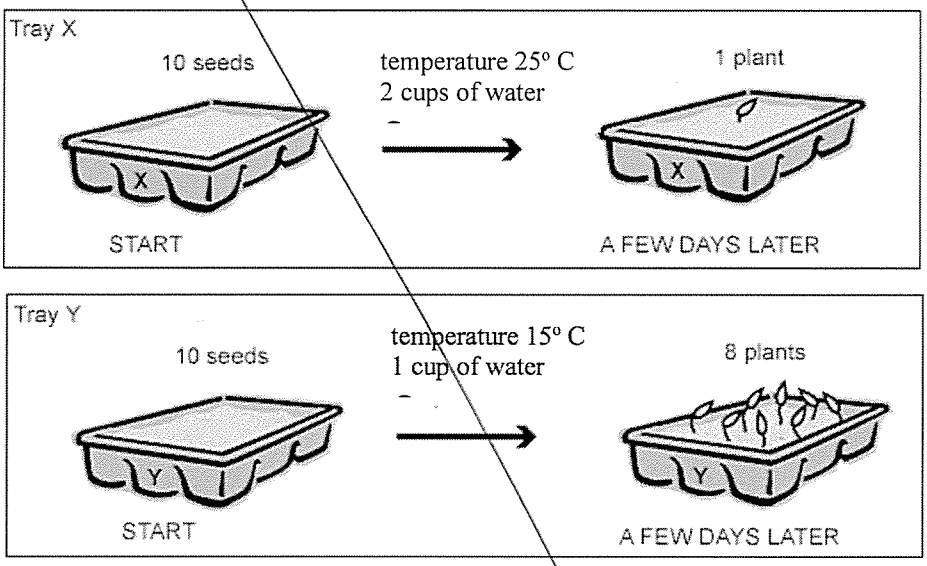
(A) The edges of both plates will be pushed upwards as the plates continue to move toward each other.
(B) The edges of both plates will be pushed downwards as the plates continue to move toward each other.
(C) One plate will stop moving, and one plate will push upwards as it continues to move toward the other plate.
(D) Both plates will stop moving.

12. Which of the following do scientists use to learn about organisms that lived many years ago but are no longer alive today?

(A) Fossils of organisms that lived many years ago, and DNA from the remain that lived many years ago.
(B) Fossils of organisms that lived many years ago, but not DNA from the remains of organisms that lived many years ago.
(C) DNA from the remains of organisms that lived many years ago, but not fossils of organisms that lived many years ago.
(D) Scientists have no way of learning anything about organisms that lived many years ago but are no longer alive today.

13. Students are planning to grow plants from seeds. They want to find out which of two temperatures, 15°C or 25°C, is better for growing these plants. They also want to find out if one cup of water or two cups of water is better for growing these plants.

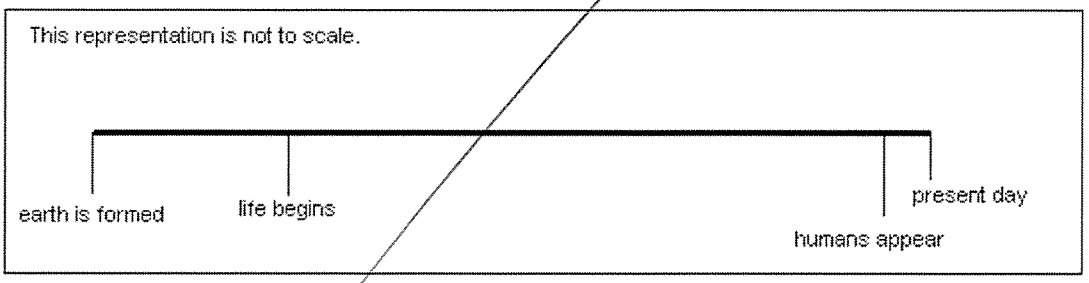
They do the following experiment. They use two trays with identical soil and they plant ten seeds in each tray. They keep Tray X at 25°C and Tray Y at 15°C. They use two cups of water for Tray X and one cup of water for Tray Y. After a few days, they count how many plants are growing in each tray.



What can the students conclude from this experiment?

(A) They can conclude that 15°C is better than 25°C for growing these plants.
(B) They can conclude that one cup of water is better than 2 cups of water for growing these plants.
(C) They can conclude that 15°C is better than 25°C for growing these plants and that one cup of water is better than two cups of water for growing these plants.
(D) It is not possible to conclude from this experiment if 15°C is better than 25°C for growing these plants or if one cup of water is better than two cups of water for growing these plants.

14. What is true about how the physical environment of the earth has changed over time? The diagram below represents a timeline showing key events mentioned in the answer choices.



(A) Many changes to the physical environment happened before life began, but hardly any changes have happened since the time that life began.
(B) Many changes to the physical environment happened after life began but before humans appeared. Hardly any changes happened before life began or after humans appeared.
(C) Many changes to the physical environment happened after humans appeared, but hardly any changes happened before humans appeared.
(D) Many changes to the physical environment have happened from the time that earth was formed until the present day.

15. The solid rock of the cliffs in the photograph is part of a continent. What is the relationship between the continent and the earth's plates?

(A) The continent is part of a plate.
(B) The continent is next to but is not part of a plate.
(C) The continent is on top of a layer of water that is above a plate.
(D) The continent is directly on top of a plate but is not part of the plate.

16. Which of the following is TRUE about the extinction of species?

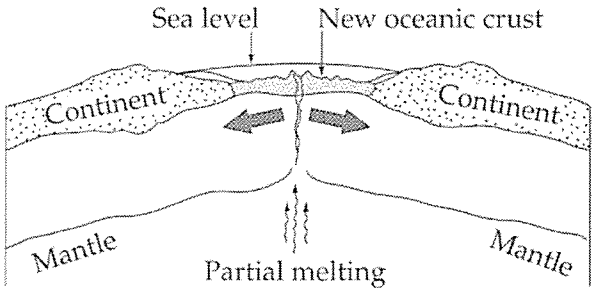
(A) Very few species have ever become extinct. Most continue to exist.
(B) There have been extinction events in which many species became extinct at about the same time. Aside from these, extinction is very rare.
(C) Up until recently, species rarely became extinct. Humans have caused the majority of extinctions.
(D) Many species have become extinct throughout the history of life on Earth.

17. Which of the following statements is TRUE about the evolution of plants and animals?

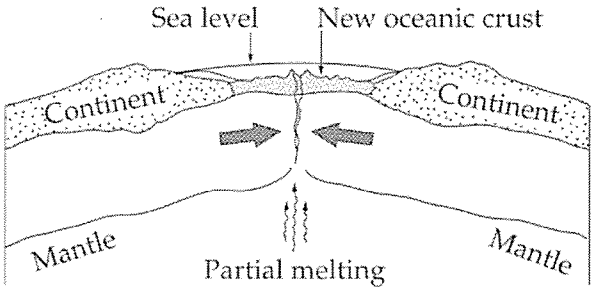
(A) All plants and animals share a common ancestor with each other.
(B) All plants share a common ancestor, but all animals do not share a common ancestor.
(C) All animals share a common ancestor, but all plants do not share a common ancestor.
(D) No plants share a common ancestor with each other, no animals share a common ancestor with each other, and no plants share a common ancestor with any animals

18. Which diagram illustrates the movement of crust at a mid-oceanic ridge?

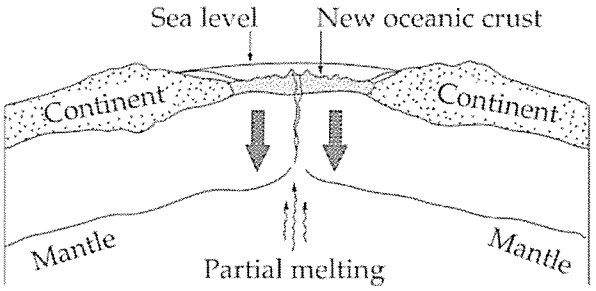
(A)



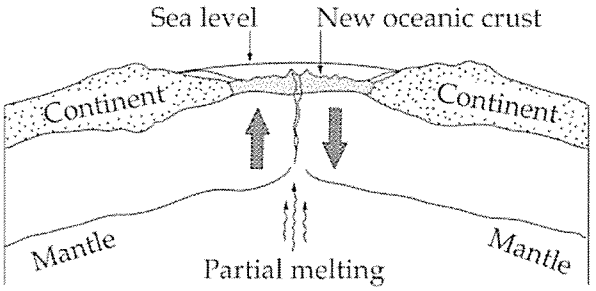
(B)



(C)

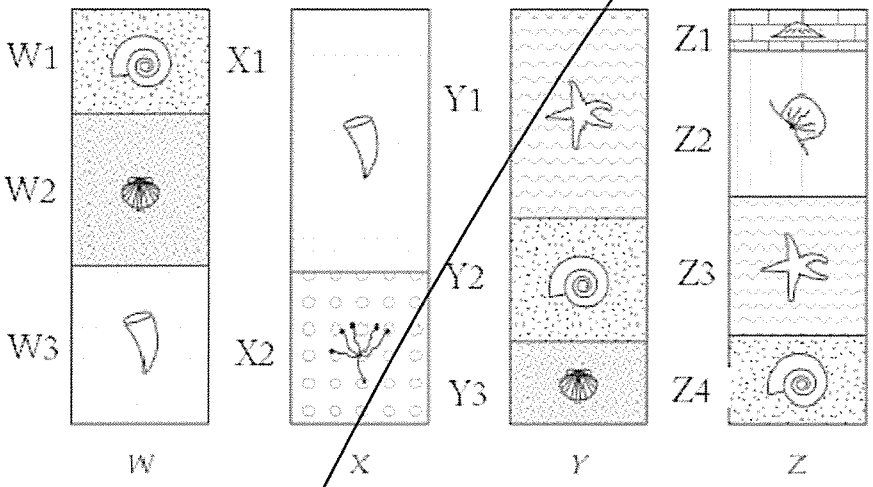


(D)



Use the diagram to answer Questions 19-20.

The diagram illustrates the fossils found at four different locations *W*, *X*, *Y* and *Z*.



19. Which of these fossils is probably the oldest?

(A) Z1
(B) W1
(C) W3
(D) X2

20. At which location was the youngest fossil found?

(A) W
(B) X
(C) Y
(D) Z

Name: _____

Place an X in the box below to indicate your Science Class

10B1 PCU	10B2 MDO	10B3 PMO	10G1 NSH	10G2 GMO	10G3 LIF

PART A (19 marks)

SECTION 2: Extended Response Questions

Question 21 (4 Marks)

Anaxagoras (500-428 B.C.) proposed the Atomist model of the universe. He put that the universe contains only two things: an infinite number of tiny seeds, or atoms, and the void of infinite extent.

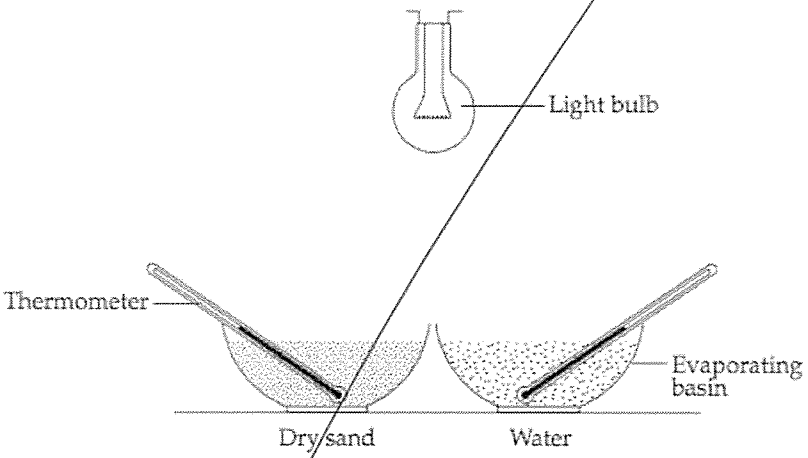
A. Name one of the historical models of the Solar System that you studied:

_____ (1 mark)

B. In the space provided produce a labelled diagram to represent this model. (3 marks)

Question 22 (7 marks)

A team of students wished to investigate how quickly two different materials absorb and release heat. They set up this experimental model. The light bulb was switched on at the start of the experiment and turned off after 10 minutes.



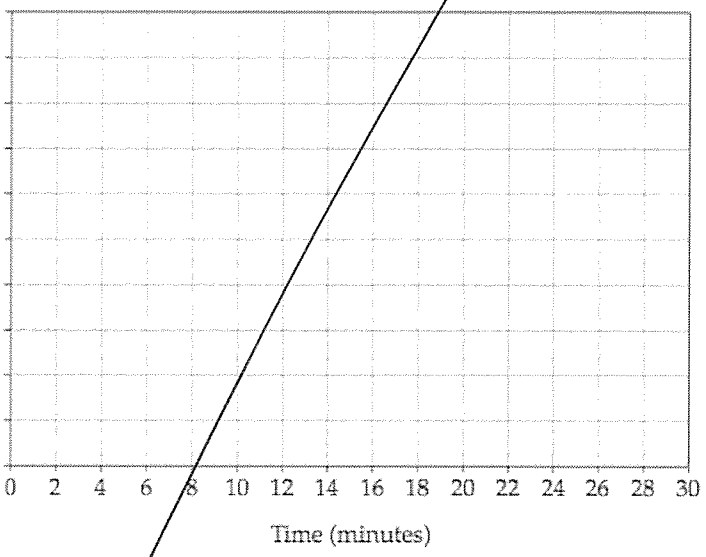
The results table the students created is shown below.

	Time (minutes)	*Temperature* (°C)	
		Dry sand	*Water*
Light bulb on	0	20.0	20.0
	2	21.0	20.5
	4	22.0	21.0
	6	23.0	21.5
	8	24.0	22.0
	10	25.0	22.5
Light bulb off	12	26.0	23.0
	14	27.0	23.0
	16	27.0	23.0
	18	26.5	23.0
	20	26.0	23.0

Question 22 continues next page

A. Name two variables that would have to be kept the same in this experiment. (2 marks)

B. Graph the results for sand from the table. (4 marks)



C. State one trend that is shown in your graph. (1 mark)

D. Use your graph to predict the sand temperature 20 minutes after the light bulb was turned off. (1 mark)

Question 23 (8 marks)

A. According to the Big Bang Theory, the universe began as a singularity with infinite energy.

Is this statement true or false? (1 mark)

B. Describe how Red Shift provides evidence for the expansion of the Universe? (3 marks)

C. Identify and explain another piece of evidence for the expansion of the universe? (3 marks)

Place an X in the box below to indicate your Science Class

10B1 PCU	10B2 MDO	10B3 PMO	10G1 NSH	10G2 GMO	10G3 LIF

PART B (21 marks)

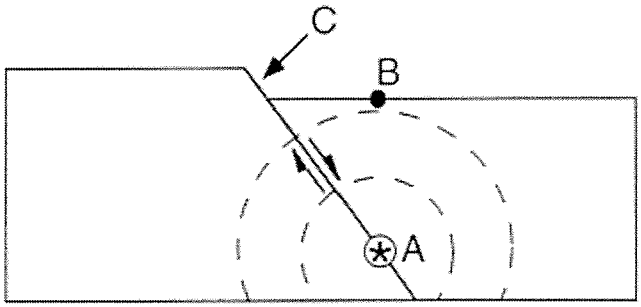
Question 24 (11 marks)

A. The following map shows the super continent Gondwana, about 170 million years ago.

Continental Drift theory describes how the modern continents were once part of the supercontinent Gondwana.

Identify and explain 3 types of evidence that suggest modern continents were once joined. (6 marks)

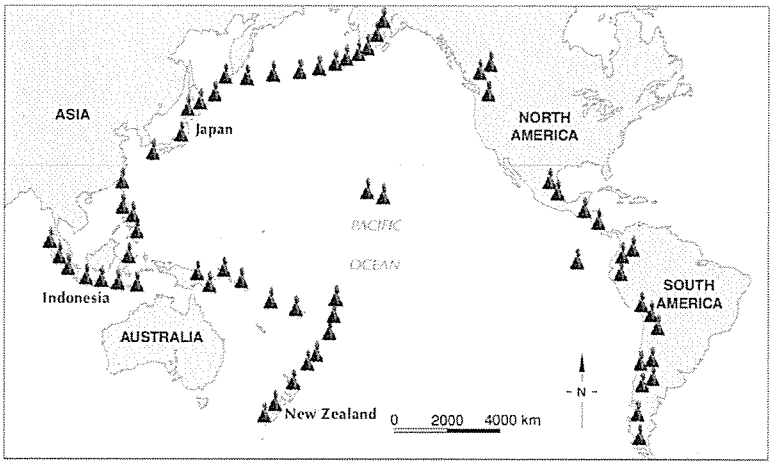
B. Using the following diagram identify which letter represents the focus and epicentre of an earthquake.



Focus: _____ (1 mark)

Epicenter: _____ (1 mark)

C. The diagram below shows the location of recent volcanic eruptions.



(i) What is the best explanation for the location of these volcanoes? (2 marks)

_____

_____

_____

_____

(ii) What is the difference between magma and lava? (1 mark)

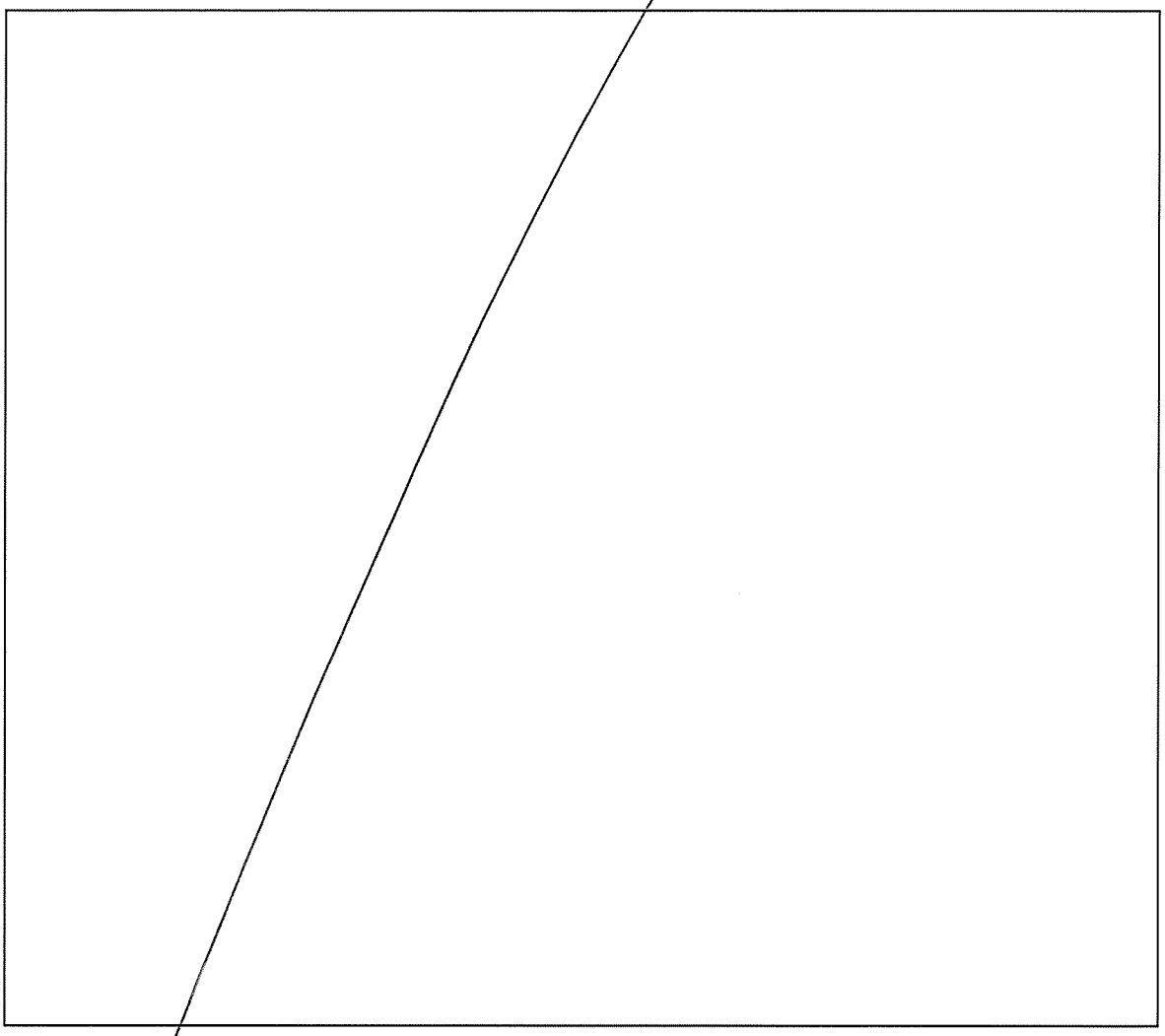
_____

_____

Question 25. (10 marks)

A. Discuss with the aid of a diagram the differences between the Greenhouse and Enhanced Greenhouse Effects. (4 Marks)

B. Draw a flowchart or a diagram showing the processes involved in the Carbon Cycle. Be sure to include at least 3 unique pathways of carbon that start and return to atmospheric carbon. (6 marks)



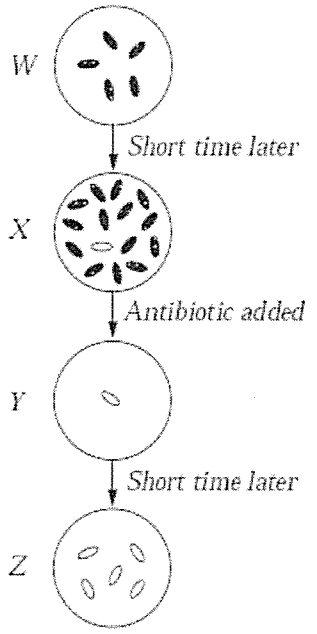
Place an X in the box below to indicate your Science Class

10B1 PCU	10B2 MDO	10B3 PMO	10G1 NSH	10G2 GMO	10G3 LIF

PART C (20 marks)

Question 26 (10 marks)

This diagram shows natural selection in a bacterial population.



A strain of bacteria makes up the population in a nutrient solution, kept in a sealed container.

Bacterial cells are able to reproduce and grow.

Most bacterial cells are killed.

Bacterial cells have multiplied rapidly, even though the antibiotic is present. A new strain of bacteria is produced.

A. Using the information in the diagram above, explain how the process of natural selection has occurred. (4 marks)

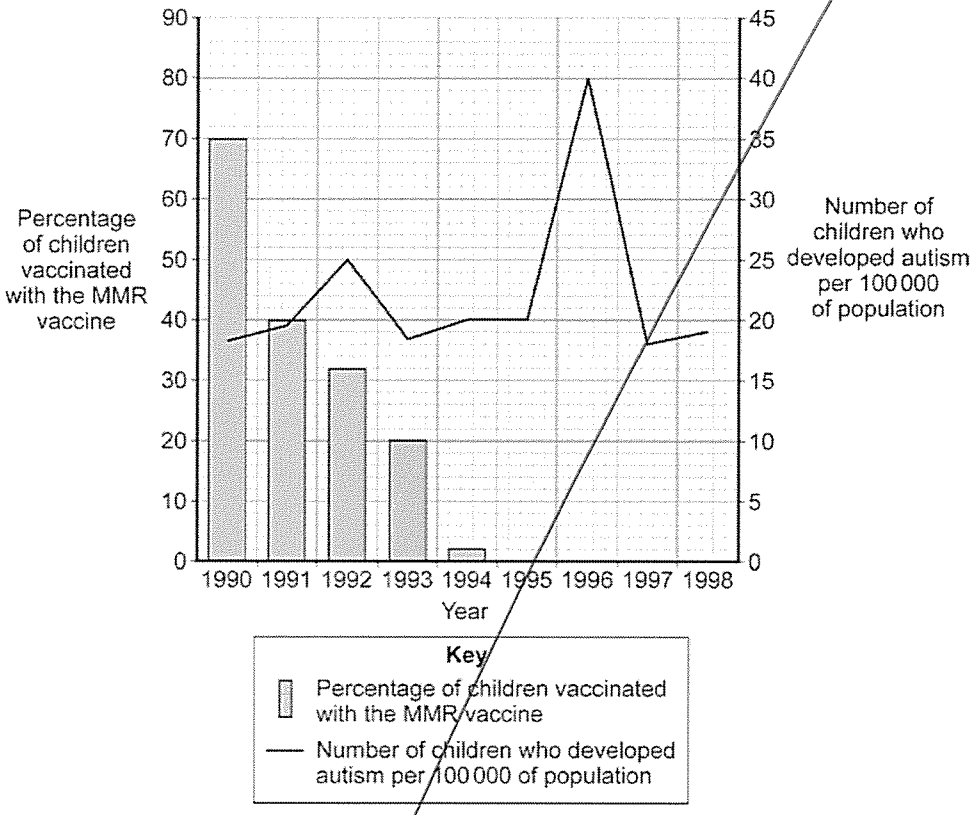
B. Define the term 'fossil'. (1 mark)

C. Describe two important conditions that are required for the formation of fossils. (2 marks)

D. Name an organism that would be most likely to form a fossil and explain reasons for your answer. (2 marks)

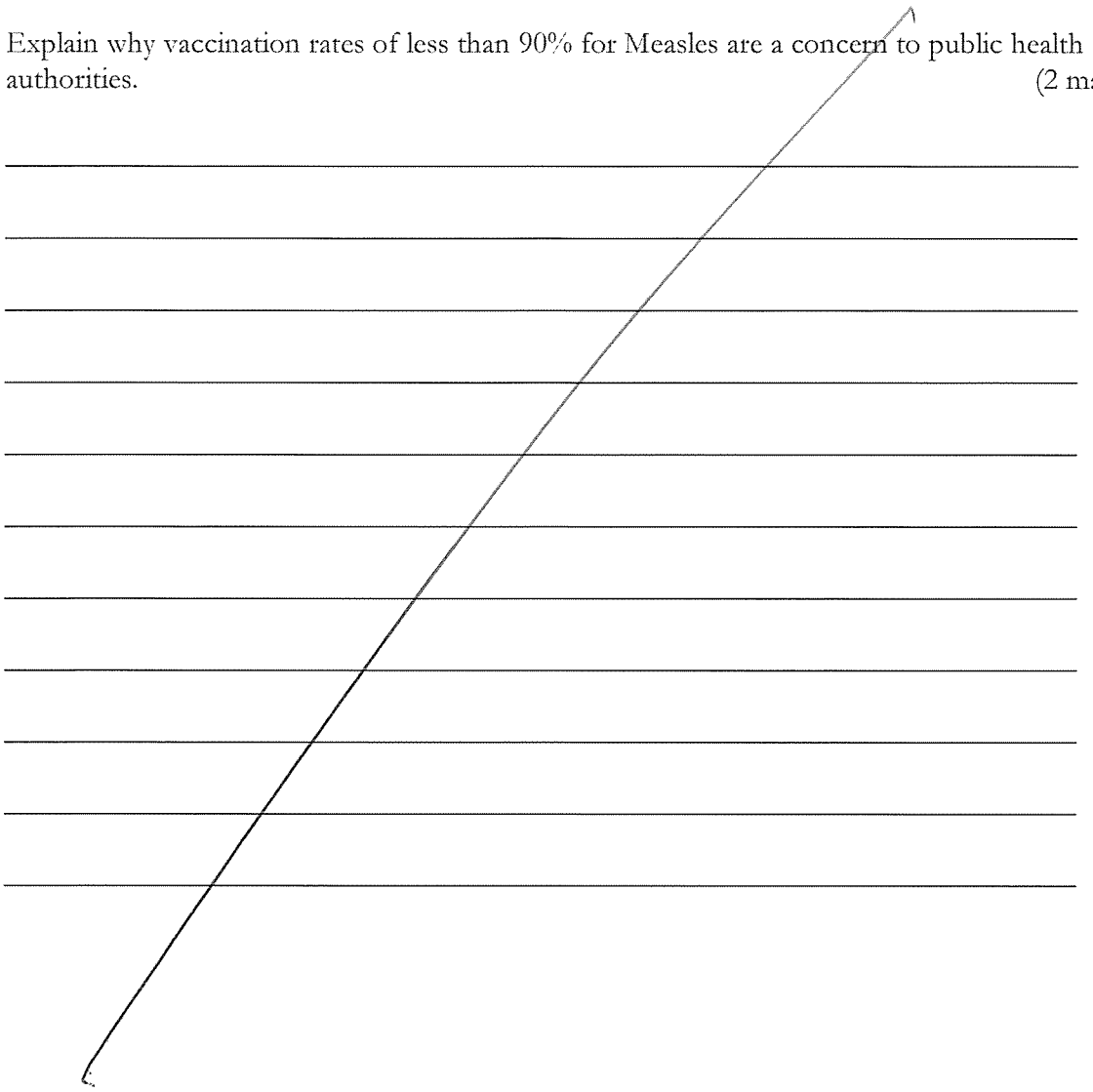
Question 27 (5 marks)

In the 1990s many people thought that the Measles, Mumps and Rubella (MMR) vaccine caused autism in some children. This is why the Japanese government stopped using the MMR vaccine.



A. As the newly appointed advisor to the Prime Minister, how would you interpret the information contained in the above graphic to recommend the re-introduction of the MMR vaccine in Japan. (3 marks)

B. Explain why vaccination rates of less than 90% for Measles are a concern to public health authorities. (2 marks)



Question 28 (6 marks)

In your studies you have completed research from secondary sources related to the Wakefield study.

A. What was the claim of the Wakefield Study? (2 marks)

B. Explain how this study was discredited? (2 marks)

C. When using secondary sources to conduct research, how do scientists ensure the information is reliable? (2 marks)

Name: _____

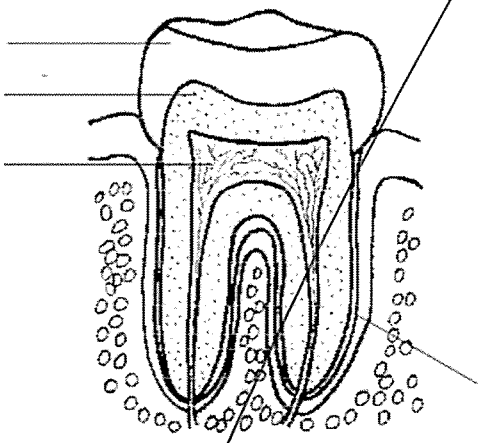
Place an X in the box below to indicate your Science Class

10B1 PCU	10B2 MDO	10B3 PMO	10G1 NSH	10G2 GMO	10G3 LIF

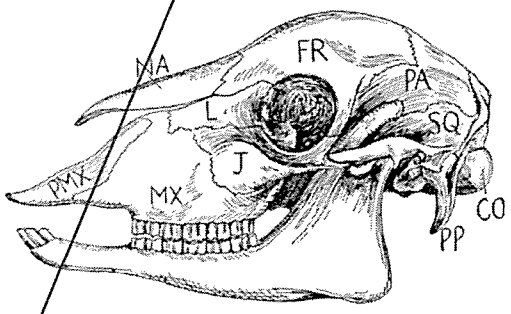
PART D (20 marks)

Question 29 (10 marks)

A. Add the words **pulp, cementum, enamel** and **dentine** to the unlabelled diagram below. (2 marks)



B. This question refers to the diagram below:



Discuss the diet of this animal. (2 marks)

_____

_____

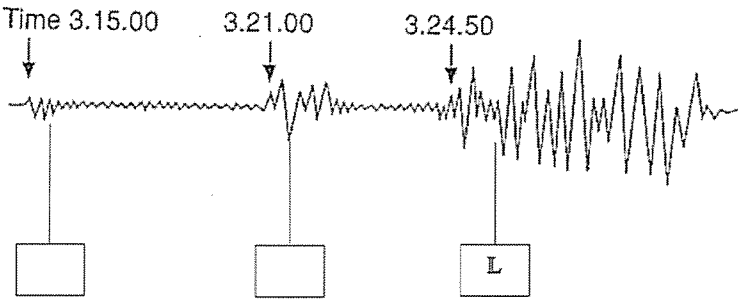
_____

_____

C. As part of your study of fluoridation, you conducted an experiment to analyse the relationship between surface area and rate of reaction. Write an appropriate method for this investigation. (5 marks)

Question 30. (6 marks)

Below is a seismograph record of an earthquake.



A. Put the letters P and S in the correct boxes above. (1 mark)

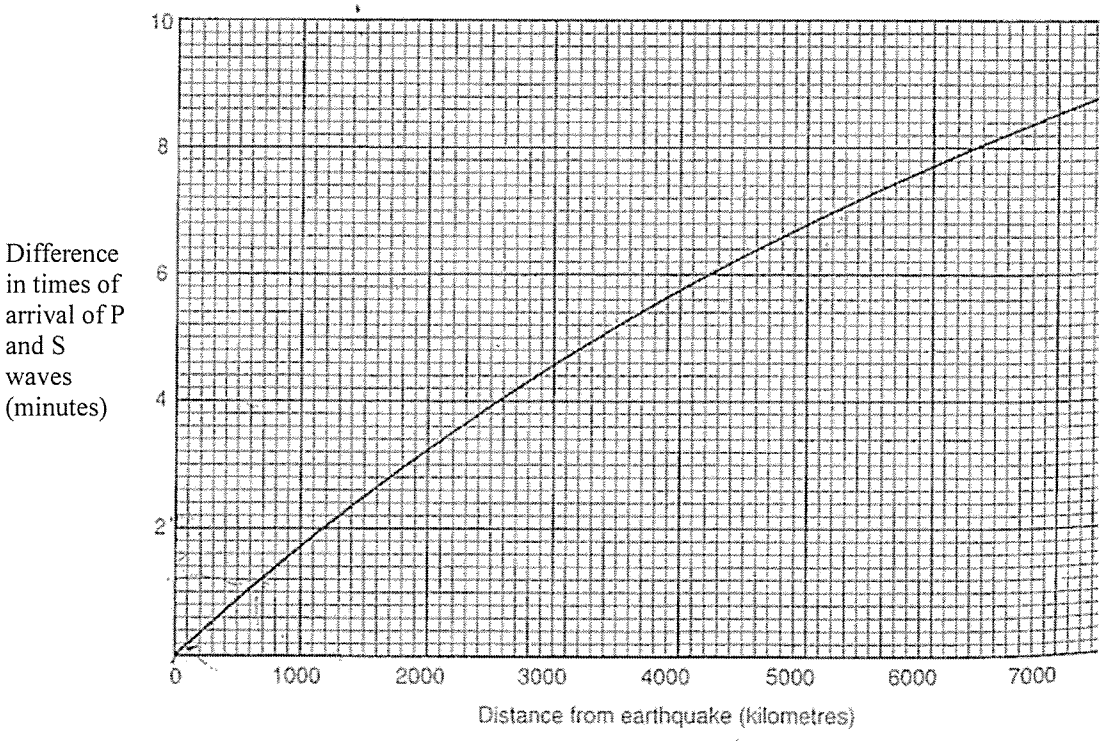
B. Which waves have the most energy? (1 mark)

_____

C. What was the difference in the arrival times of the P and S waves? (1 mark)

_____

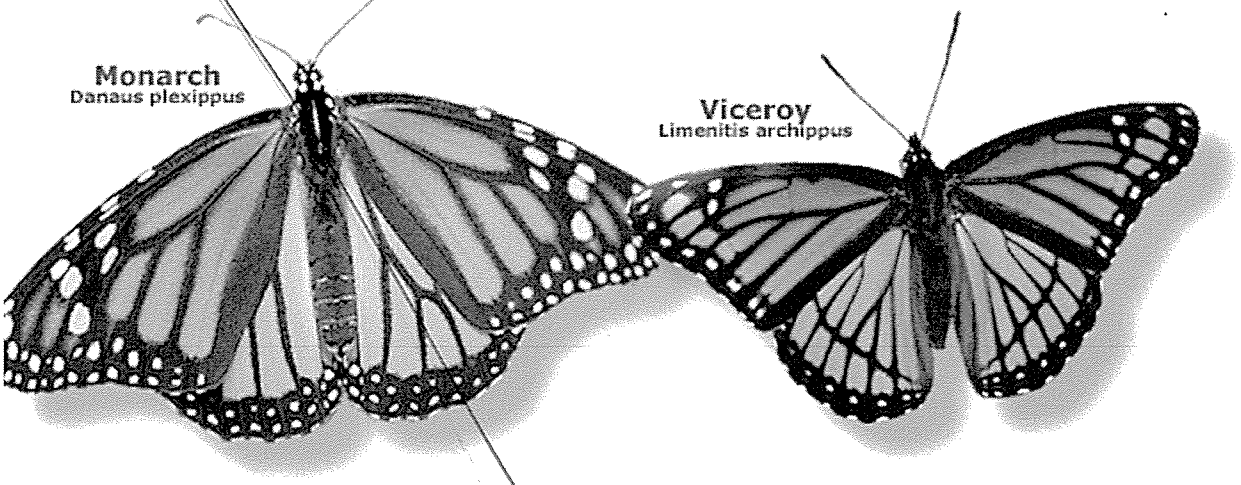
D. Use the graph below to determine how far away the earthquake was. (1 mark)



E. From your answer in (D.) can you work out the epicentre of the earthquake? Explain your answer. (2 marks)

Question 31 (5 marks)

A. In 1862 an English naturalist suggested that some species evolve to look like poisonous species. The similar appearance of the unrelated Monarch and Viceroy butterflies is an example of this.



The Monarch butterfly produces a bitter-tasting chemical.

(i) How is this an adaptation for survival? (2 marks)

(ii) Describe how the process of natural selection could account for the appearance of the Viceroy butterfly. (3 marks)

Name_____

Place an X in the box below to indicate your Science Class

10B1 PCU	10B2 MDO	10B3 PMO	10G1 NSH	10G2 GMO	10G3 LIF

Year 10 Science 2017
Multiple Choice Answer Sheet

Place a neat cross in the box to indicate the best answer.

	A	B	C	D
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

Name: _____

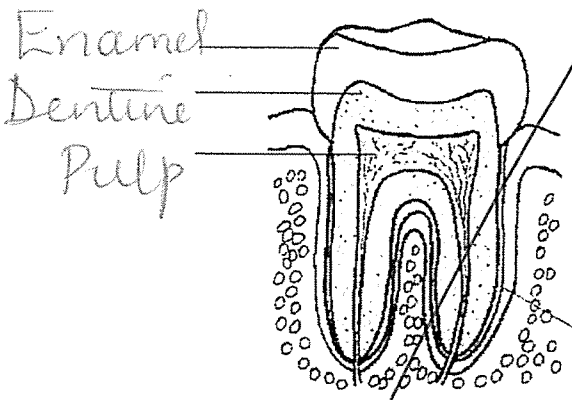
Place an X in the box below to indicate your Science Class

10B1	10B2	10B3	10G1	10G2	10G3
PCU	MDO	PMO	NSH	GMO	LIF

PART D (20 marks)

Question 29 (10 marks)

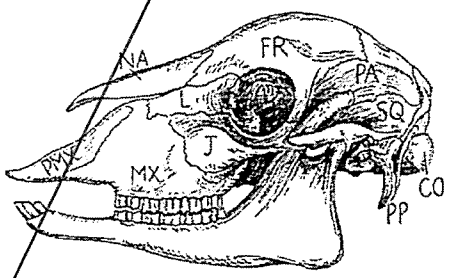
A. Add the words **pulp, cementum, enamel** and **dentine** to the unlabelled diagram below. (2 marks)



4 correct 2 marks

2 correct or more 1 mark

B. This question refers to the diagram below:



Discuss the diet of this animal. (2 marks)

(Grind plants) (tearing plants)
- Molars & incisors
Premolars
- cellulose based food. (plants)

Refers to two types of teeth and relates to diet 2 marks

Correctly identifies 1 type of tooth 1 mark

C. As part of your study of fluoridation, you conducted an experiment to analyse the relationship between surface area and rate of reaction. Write an appropriate method for this investigation. (5 marks)

- Clearly identified and numbered steps
- Refers to correct chemical and concentration quantities
- Refers to ~~potato~~ source of enzyme
- Three different surface areas
- Control included
- Correctly names laboratory equipment
- Includes ~~qual~~ quantities (mls H_2O_2, amount of potato)

Observations / Results

1) 4 labelled test tubes
2) Cut three $1cm^3$ pieces of potato
3) tube 1: whole cube
4) tube 2: cube chopped into smaller cubes
5) tube 3: mashed
6) 10 mL H_2O_2 to all 4 tts
7) tube 4: control
8) Measure bubble column height in each tt.
9) Record.
10) Repeat.

5 of the above — 4 marks

~~4~~ 4 of the above — 3 marks

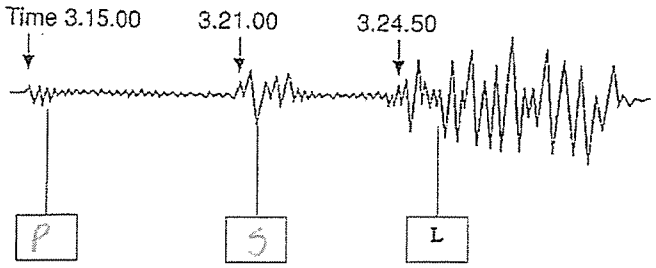
3 of the above — 2 marks

2 of the above — 1 mark

5 marks

Question 30. (6 marks)

Below is a seismograph record of an earthquake.



A. Put the letters P and S in the correct boxes above. Correct (1 mark)

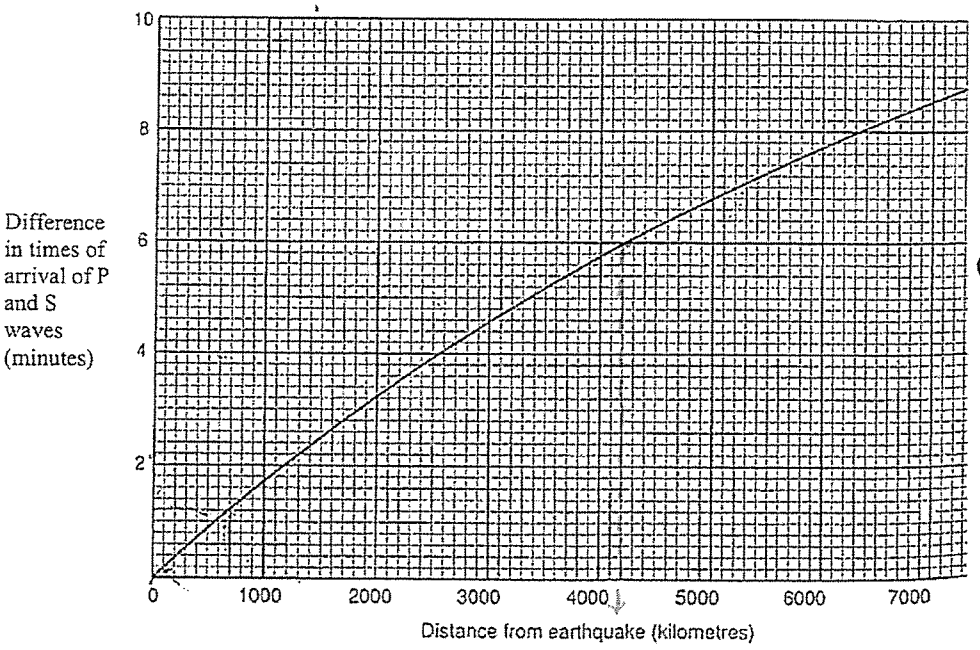
B. Which waves have the most energy? (1 mark)

L Correctly identifies (1 mark)

C. What was the difference in the arrival times of the P and S waves? (1 mark)

6:00 minutes Correctly identifies (1 mark)

D. Use the graph below to determine how far away the earthquake was. (1 mark)



Correct Answer 1 mark

4200 km - 4250 km

E. From your answer in (D.) can you work out the epicentre of the earthquake? Explain your answer. (2 marks)

① A seismic record from 2 other locations are Not required.

Identifies epicentre and explains 2 marks

Identifies epicentre 1 mark

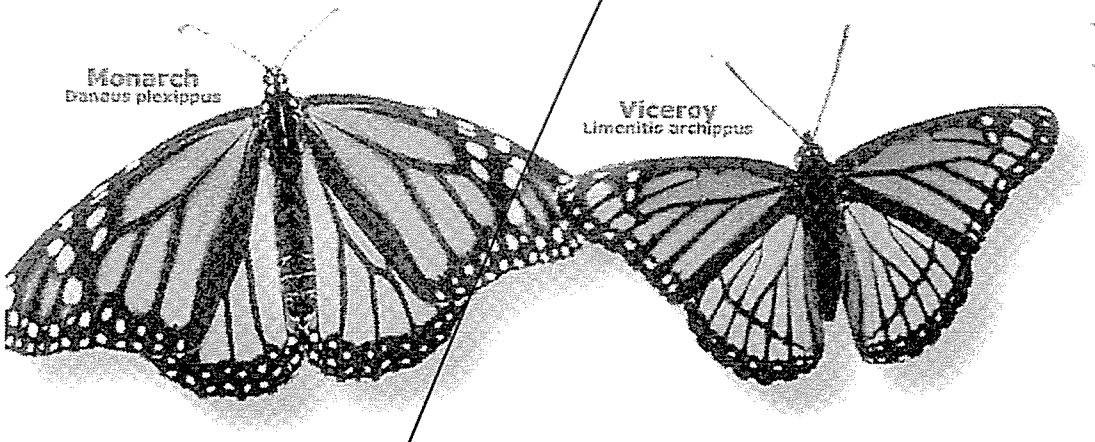
② Determine how far away the ~~earthquake~~ epicentre was from the seismic station.

③ The distance from the epicentre = radius on the map (100km = 1cm) : Draw 3 circles of the distance the 3 seismic stations to epicentre.

The point where all the circles overlap is the epicentre of the earthquake

Question 31 (5 marks)

A. In 1862 an English naturalist suggested that some species evolve to look like poisonous species. The similar appearance of the unrelated Monarch and Viceroy butterflies is an example of this.



The Monarch butterfly produces a bitter-tasting chemical.

(i) How is this an adaptation for survival? (2 marks)

Adaptation: It is a process or change by which an organism or species becomes better suited to its environment.

Unpalatable taste like monarch - adaptation

Bright colour

Not eaten by predators

~~are mistaken for~~ survival

~~poisonous monarch~~

Defines ~~adaptation~~ term adaptation and links to survival 2 marks

Links adaptation to survival 1 mark

(ii) Describe how the process of natural selection could account for the appearance of the Viceroy butterfly. (3 marks)

monarch - unpalatable coloured wings - sign of toxicity

Viceroy - mutation/variation with a species (more palatable) mimicked the monarch

Predators of the viceroy avoided them

Viceroy survived passed on these characteristics (brightly coloured like monarch) to offspring

~~Relates~~ Relates process of natural selection to this particular adaptation discussing mutation and survival of fittest 3 marks

~~Relates~~ As above referring to mutation or survival of fittest 2 marks

... relevant information 1 mark