Name: …….....

YEAR 11

EARTH AND ENVIRONMENTAL SCIENCE

Select the alternative A, B, C or D that best answers the question.

Fill in the response space completely. If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

If you change your mind and have crossed out what you consider to be the correct answer, then indicate this by writing the word ***correct*** and drawing an arrow.

Question	A	B	C	D
1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D
5	A	B	C	D
6	A	B	C	D
7	A	B	C	D
8	A	B	C	D
9	A	B	C	D
10	A	B	C	D
11	A	B	C	D
12	A	B	C	D
13	A	B	C	D
14	A	B	C	D
15	A	B	C	D

No. of Copies: 35 **Name: …….....**

Miss K Gillies
Mr P Hare

SEMESTER II, 2004

Preliminary Course

EARTH AND ENVIRONMENTAL SCIENCE

2 UNIT

TIME ALLOWED: 2 HOURS

DIRECTIONS TO CANDIDATES:

* Answer **ALL** questions. Total marks 75.

* A ***Geological Time Scale*** is included on **Page 24** on the reverse side of the multiple choice answer sheet

* This paper is in **TWO PARTS**

* **SECTION A - 15** one-mark multiple choice questions. Indicate all answers on the Answer Sheet provided. **Remove the multiple choice answer page to complete your answers.**

*** SECTION B** – Total 60 Marks
Short Answer and Longer Response questions.
All answers are to be written in the spaces provided.

Good luck

Section A

Questions 1 to 15 (1 mark each)
Multiple choice questions, choose the best answer.
Indicate all answers on the Answer Sheet provided on Page 24.

1. Initially the Earth had no free oxygen in the atmosphere. The build up of oxygen was as a result of the activity of early organisms.

   What were the first organisms to produce oxygen?

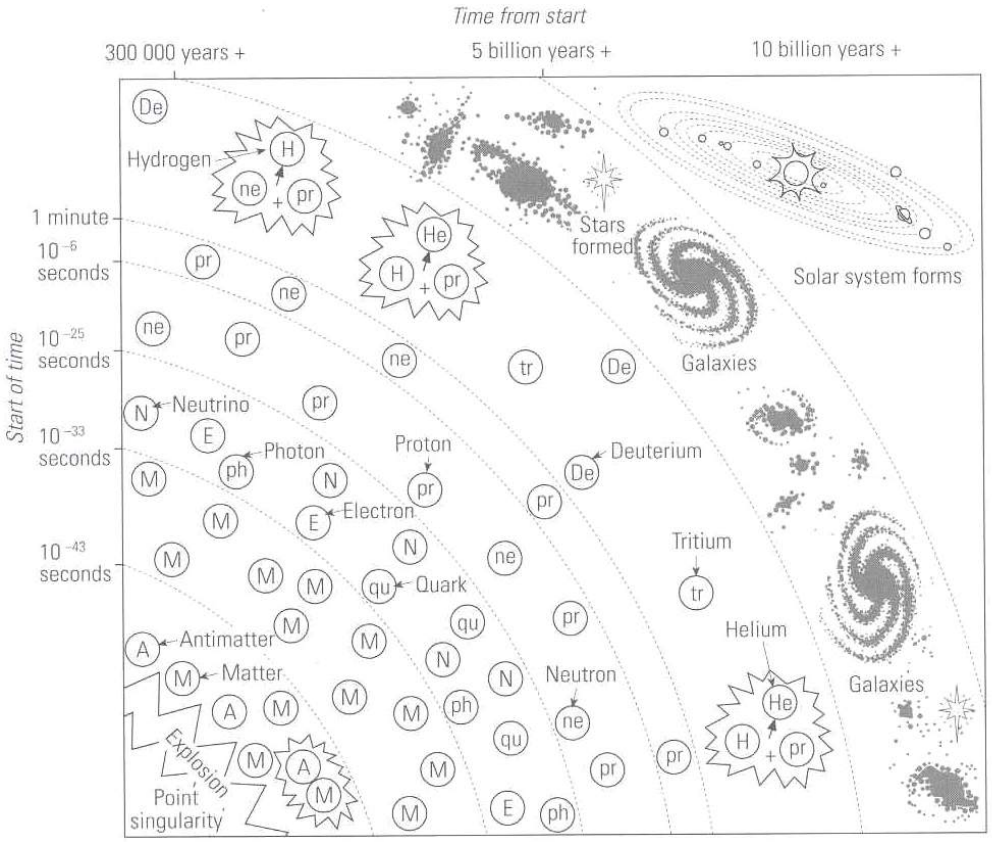
   (A) algae which carried aerobic respiration.

   (B) zooplankton which carried out photosynthesis.

   (C) archaeobacteria which carried anaerobic respiration.

   (D) bacteria similar to those found near deep ocean volcanic vents.

2. The diagram below contains information related to the universe



What is the order of formation of objects in the universe?

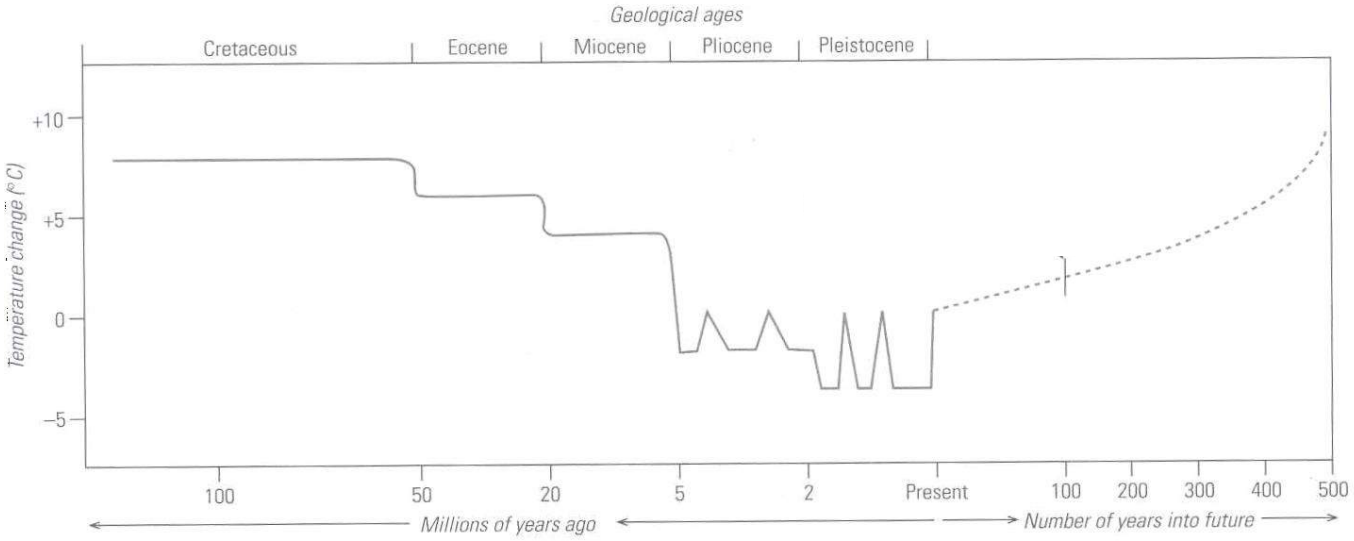
A Matter, Photons, Antimatter, Solar Systems, Galaxies

B Antimatter, electrons, Hydrogen, Galaxies, Solar Systems

C Matter, Antimatter, Protons, Neutrinos, Galaxies, Solar Systems

D Solar Systems, Helium, Galaxies, Neutrons, Photons, Antimatter.

3. The graph shows temperature fluctuations determined from the ratio of radio-isotope forms of oxygen in sea floor sediments in the past and a predicted trend in the future.



What could cause the predicted temperature increase in the future?

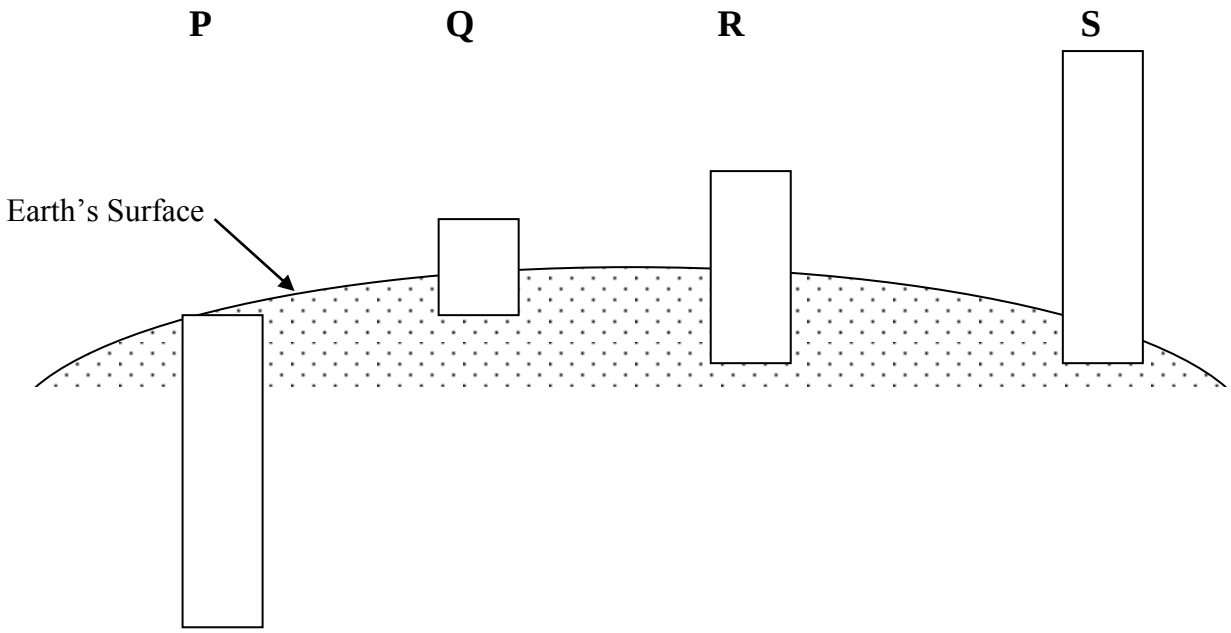
A Increasing amounts of oxygen in sea water

B Increased solar radiation reaching the Earth

C Reduced amounts of ozone in the atmosphere

D Increasing levels of carbon dioxide in the atmosphere

4. The diagram below shows the distribution of four zones of the Earth.



The distribution of the atmosphere, biosphere, lithosphere and hydrosphere are represented respectively by –

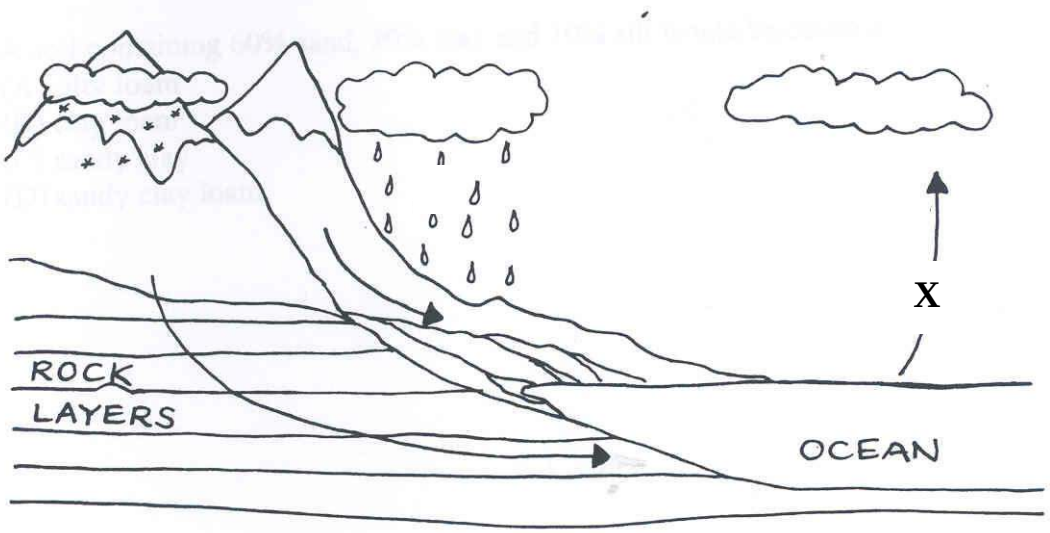
(A) S, R, P, Q.

(B) S, Q, P, R.

(C) R, Q,P, R.

(D) S, P, Q, R.

5. The diagram below shows the water cycle



What is the name of the process occurring at **X?**

(A) infiltration.

(B) evaporation.

(C) precipitation.

(D) transpiration.

6. A student examined a sample of rock in class and wrote the following description in her note book.

> The rock contained interlocking crystals which were large enough to see without a hand lens. The teacher said the rock had a lot of ~~quarts~~ quartz. There was no evidence of any layers or mineral alteration. It was decided that the rock had formed from a magma in the Earth.

Based on her information, how is the rock best classified?

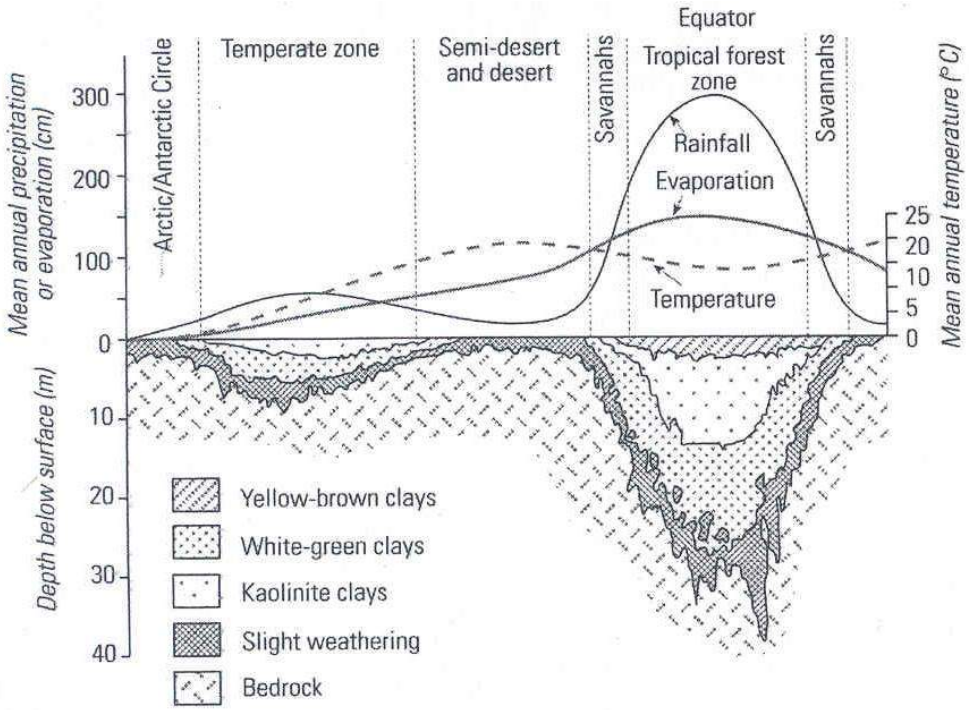
(A) igneous and volcanic.

(B) igneous and plutonic.

(C) sedimentary.

(D) metamorphic.

7. The diagram below shows how latitude, climate and soil formation are related.



What factor would contribute most to the development of thick soils?

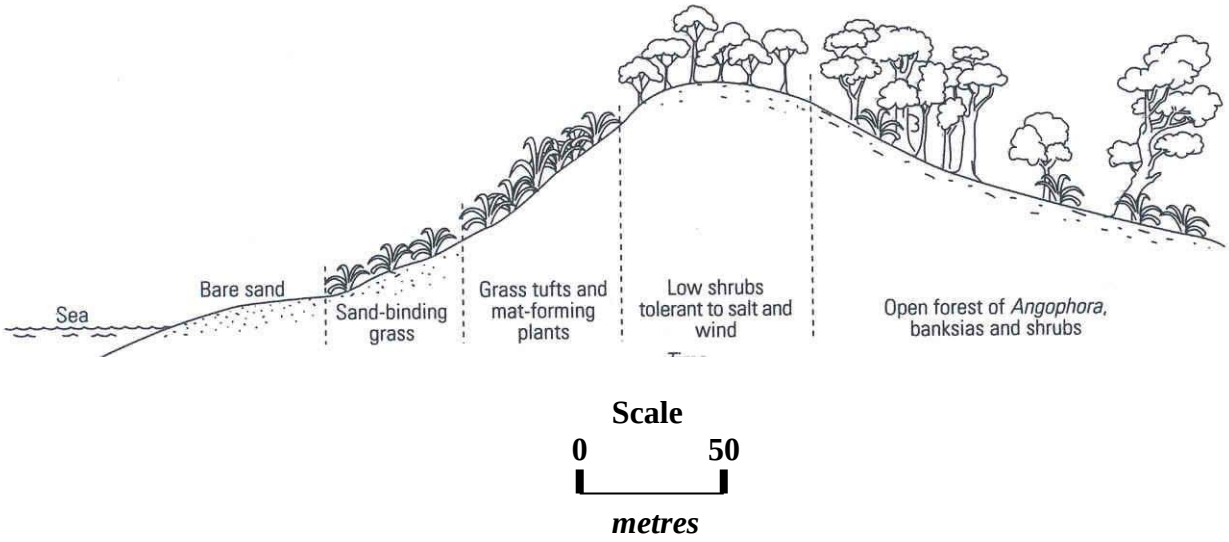
(A) temperature.

(B) evaporation.

(C) bedrock.

(D) rainfall.

8. The diagram below shows the changes in vegetation across a sand dune.



What factor could result in the succession of plants on the dune?

(A) altitude.

(B) fencing the area.

(C) increased rainfall away from the coast.

(D) increased soil nutrients and carbon content away from the sea.

9. What happens to the capacity of water to hold oxygen as the water temperature decreases?

(A) remains constant.

(B) increases.

(C) decreases.

(D) fluctuates.

10. Which common pollutant could be increased in rivers as a result of using fertillizer?

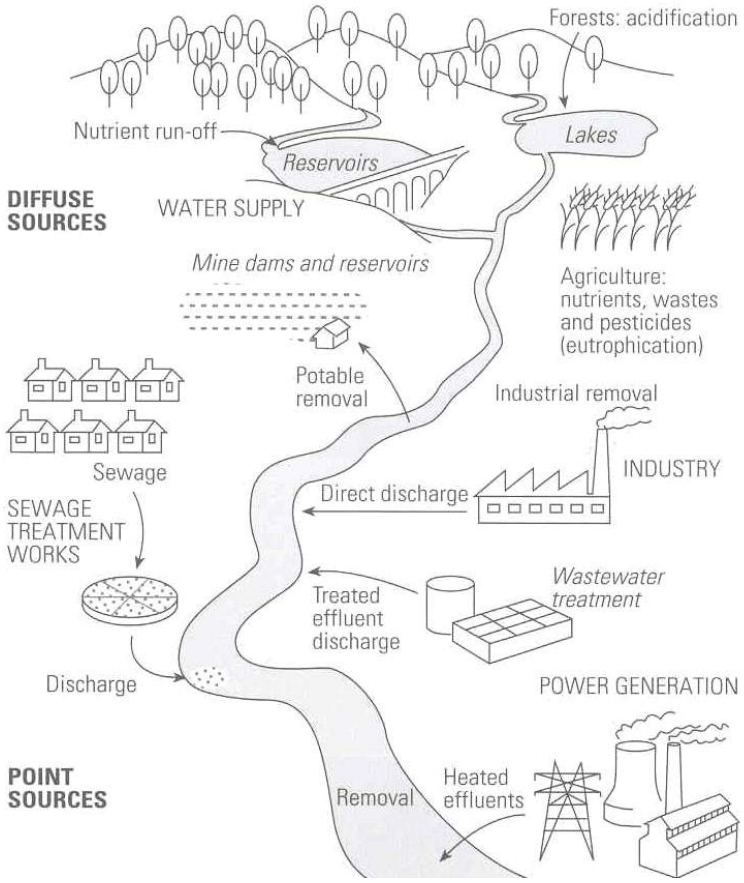
(A) chlorides.

(B) potassium.

(C) phosphates

(D) carbon dioxide.

11. The diagram below shows the some possible sources of pollution in a river.



What is a possible effect on the ecosystem of adding nutrients to the river?

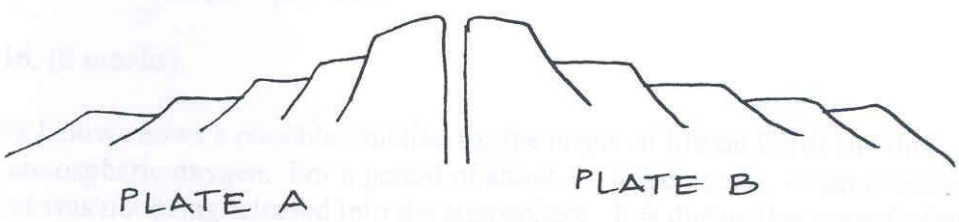
A algal blooms can occur

B the water becomes acidic

C the level of heavy metals increase

D the water becomes unsuitable for agriculture

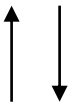
12. The diagram below shows a cross section through a part of the Earth above a plate boundary.



Which of the arrows indicate the relative movement of these two plates?

(A)

(B) 

(C) 

(D) 

13. Samples of Zircon crystals from Mt Narryer in Western Australia have been dated and their age determined to be between 4 000 and 4 200 million years old.

In which **EON** did the Mt Narryer zircons form?

(A) Phanerozoic.

(B) Proterozoic.

(C) Archean.

(D) Hadean.

14. What is the asthenosphere?

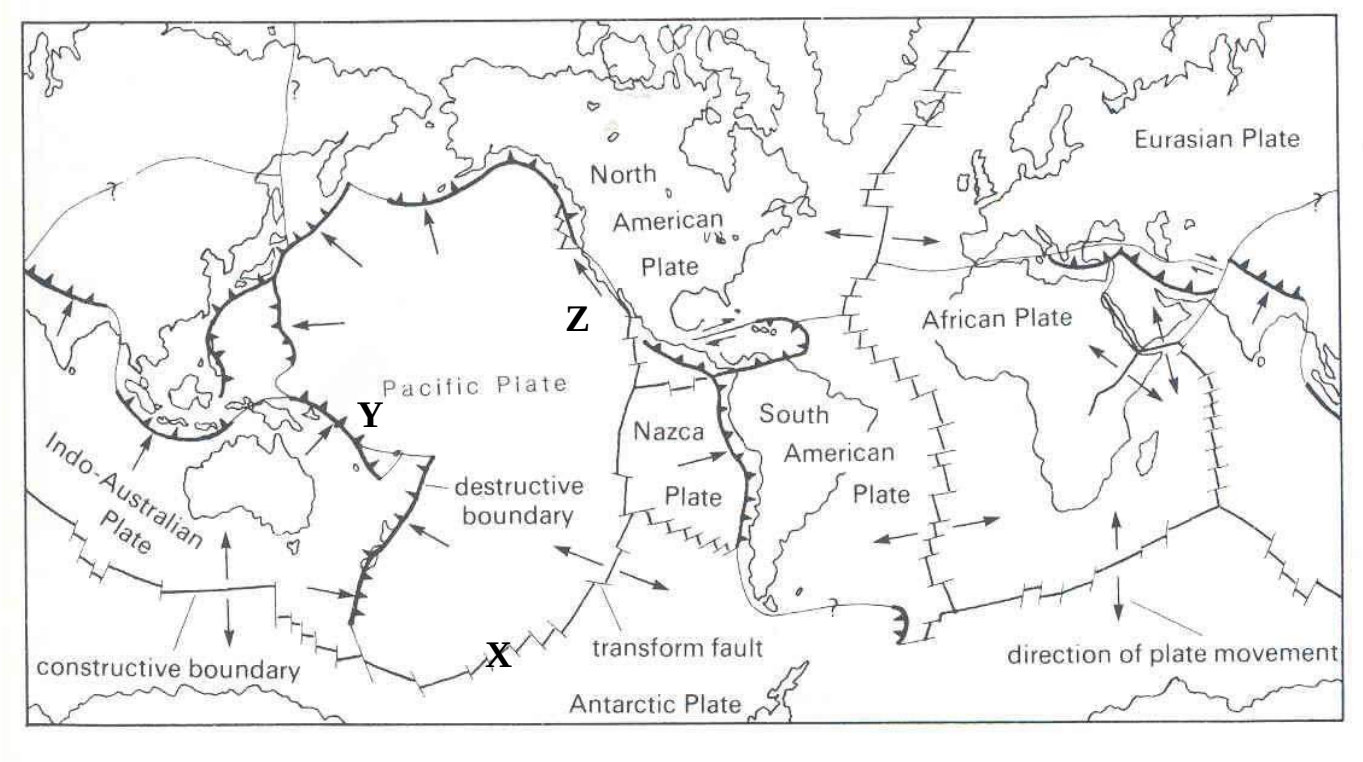
(A) a rigid layer beneath the Earth's crust.

(B) a partially molten zone above the mantle.

(C) a mobile zone which allows plates to move.

(D) the molten layer between the core and the mantle.

15. Refer to the map below



What type of plate boundary is at X, Y and Z?

(A) X is a divergent boundary, Y is a conservative boundary and Z is convergent plate boundary.

(B) X is a conservative boundary, Y is a divergent boundary and Z is convergent plate boundary.

(C) X is a divergent boundary, Y is a convergent boundary and Z is conservative plate boundary.

(D) X is a convergent boundary, Y is a conservative boundary and Z is divergent plate boundary.

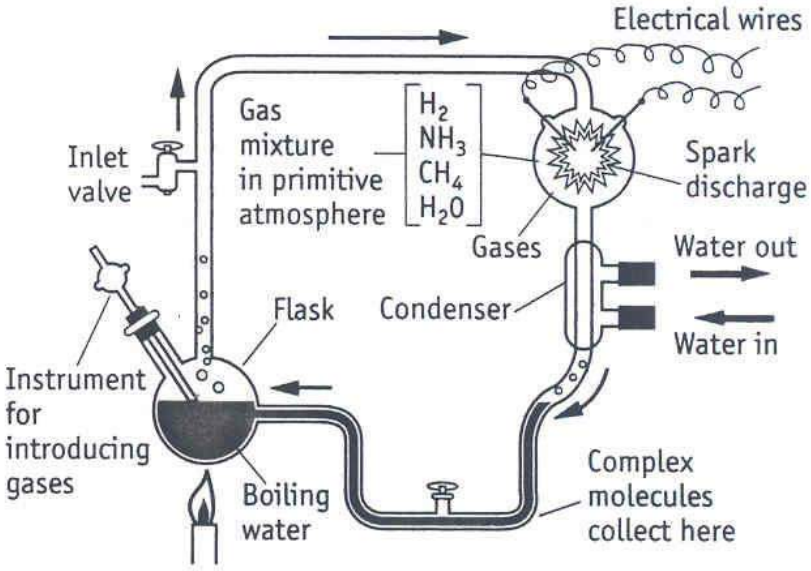
Name: .....

Section B

Questions 16 to 26 (Total 60 Marks)

Write your answers in the appropriate space on this paper.

16. The diagram below shows the apparatus Stanley Miller and Harold Urey used to reproduce conditions of the early Earth.



Assess the importance of the findings of Urey and Miller to our understanding of how life may have originated on Earth. ***4 Marks***

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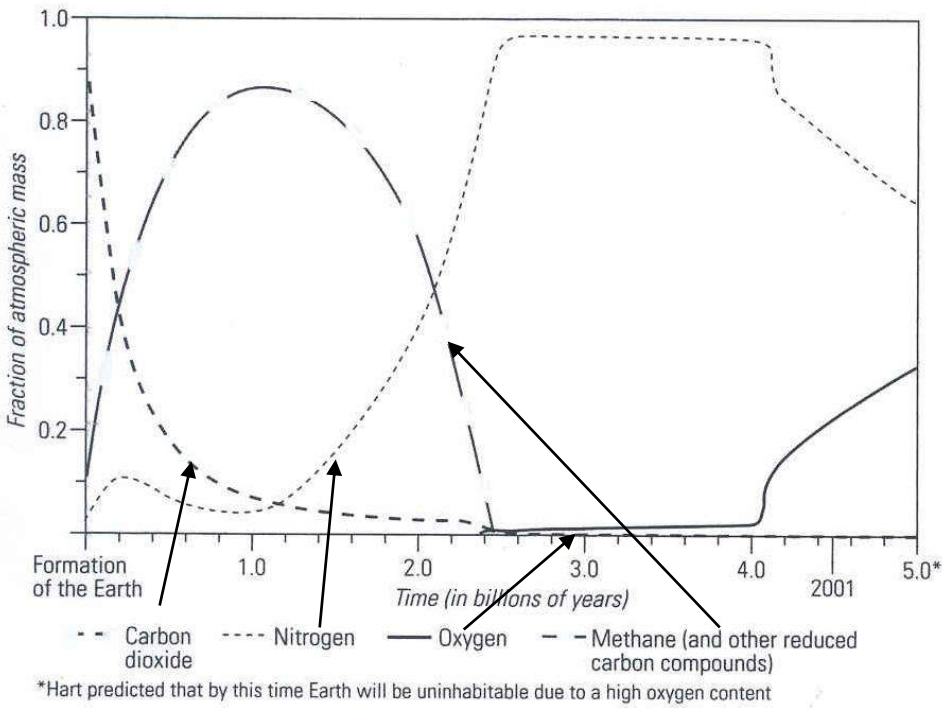
17. The diagram below shows Hart's estimates of atmospheric gases throughout Earth history.

For a period of about 1.5 billion years, oxygen was being produced but was not released into the atmosphere. During this time Banded Iron Formations (BIFs) are known to have formed.



a) Briefly describe Banded Iron Formations ***2 Marks***

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b) Identify the process responsible for the introduction of large amounts of oxygen into the atmosphere. ***1 Mark***

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c) Explain why atmospheric oxygen did not become a major component of the atmosphere during the time that Banded Iron Formations were being produced. ***3 Marks***

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18. List the sequence of events used by scientists to explain the formation of the solar system. ***3 marks***

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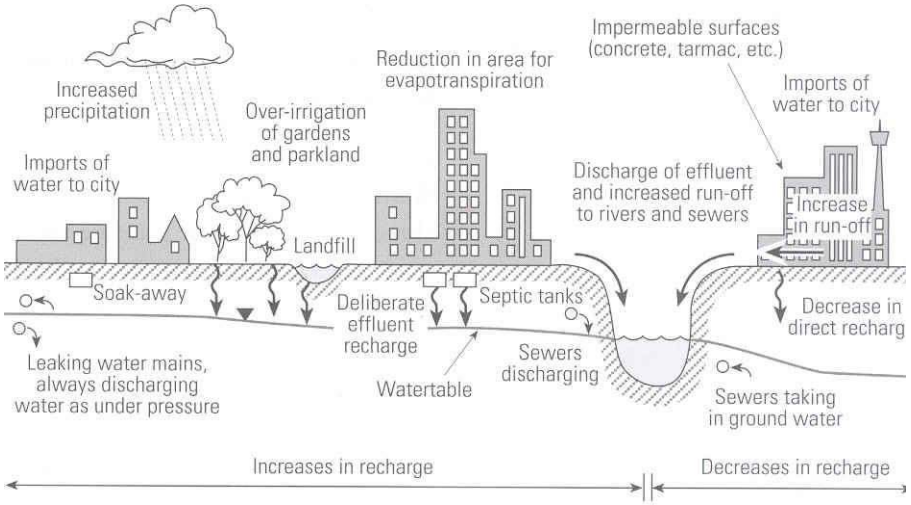
19. The diagram below shows the effects of urban development on groundwater.



A Describe **ONE** factor which would cause a rise in the water table. ***2 Marks***

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B Explain how urban development can cause less recharge to ground water. ***3 Marks***

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20. Assess any current human impacts on the local biotic and abiotic environment in an area you have studied. ***5 marks***

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21. Identify one possible effect of global warming and explain how it will effect humans. ***3 marks***

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22. Describe the relationship between the density of Earth materials and the layered structure of the Earth. ***2 Marks***

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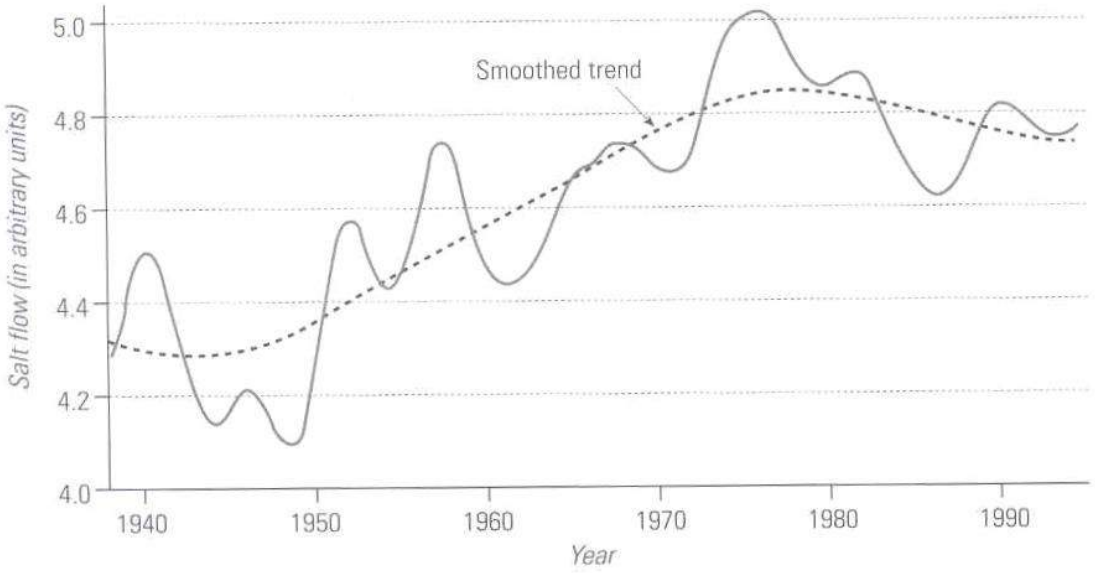
23. Refer to the graph below which shows salinity in the Murray River at the town of Morgan from 1940 until 1955.



Analyse the information shown in the graph. ***3 marks***

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24. Identify and describe ONE environmental issue that requires some government regulation or management. ***4 Marks***

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25. In your Earth and Environmental Science course you have carried out a first hand investigation to determine the effect of salinity on plant growth.

a) Describe the method you used to set up the experiment. ***2 marks***

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b) Summarise your results. ***2 marks***

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c) Assess the validity of the results you obtained. ***2 marks***

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26. Explain what is meant by the term ‘biodiversity’. ***2 Marks***

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27. In your Earth and Environmental Science course you have used secondary sources including library resources, internet and media to provide information on various topics, including the effect on an ecosystem due to a change in water availability.

Using information gathered from secondary sources -

Describe the effect on the ecosystem of restoring the river flow of the Snowy River. ***4 marks***

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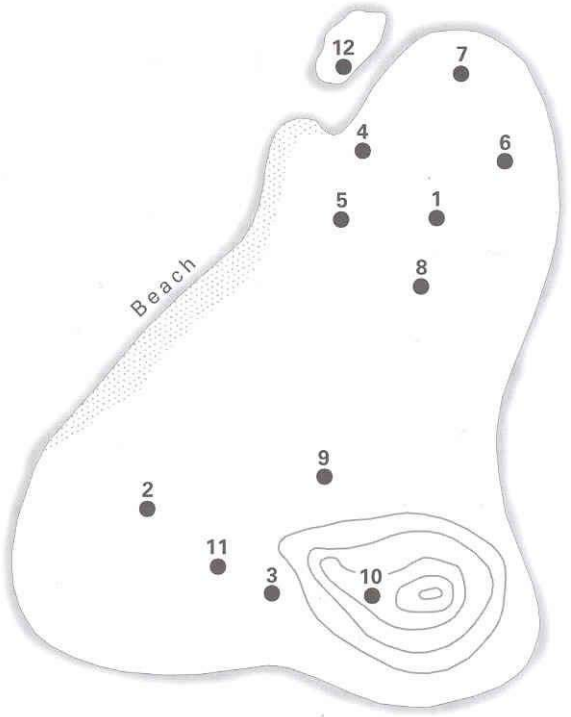
28. A team of scientists have collected samples on Scott Island, a small island 100 km off the North coast of Antarctica. The island has formed from volcanic activity from a still active volcano located at the South Eastern corner of the island.

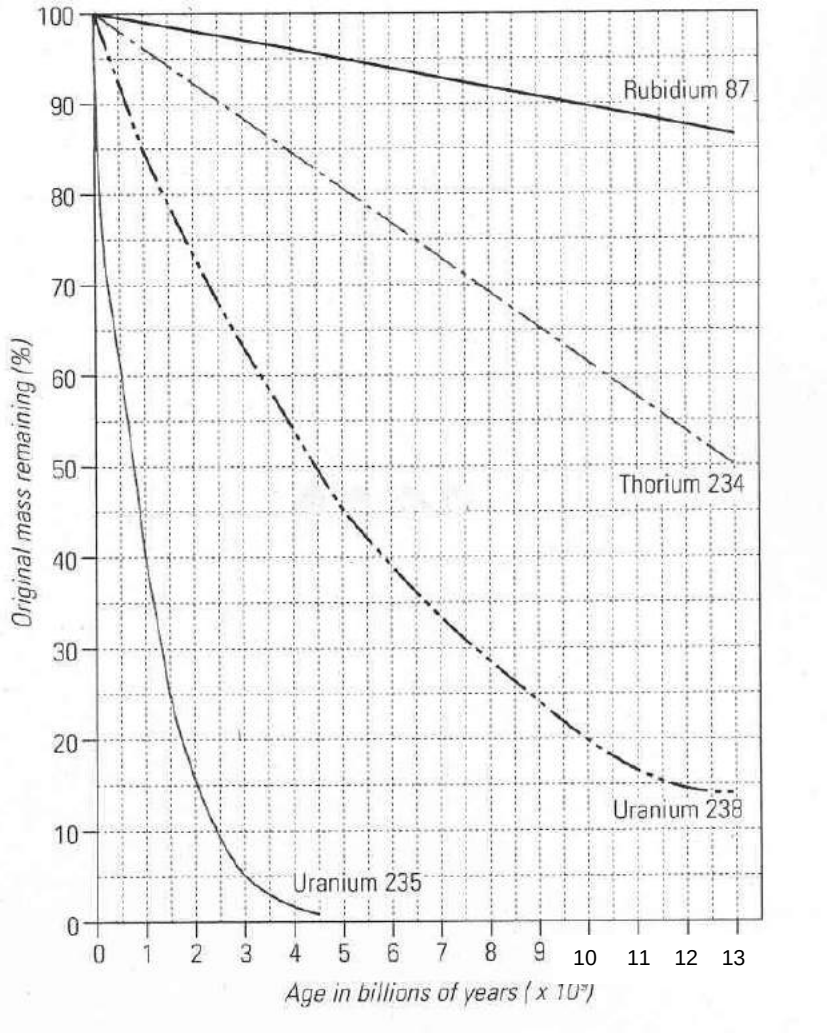
The island and the sample localities are shown on the map below.



The percentage of the original amount of radio active elements present in the sample are shown in the table below.

Sample	Radioactive Element	% of Original element remaining	Age of sample in billions of years (10^9)
1	Uranium 238	79.0	1.5
2	Rubidium 87	98.0	2.0
3	Uranium 235	95.0	0.1
4	Uranium 238	79.0	1.4
5	Rubidium 87	98.0	3.5
6	Thorium 234	92.5	2.0
7	Uranium 235	16.0	1.9
8	Thorium 234	90.0	
9	Uranium 235	80.0	0.2
10	Uranium 235	100.0	0.0
11	Uranium 235	65.0	
12	Rubidium 87	90.0	

Some samples have their age determined using the radioactive decay graphs below.



A Determine the ages of samples 8, 11 and 12, and record their ages in the table. ***3 Marks***

B Account for the age of rock sample 12 ***2 Marks***

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29. a) Define the term Subduction Zone. ***2 Marks***

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b) In the space below draw a plan view of a transform fault at mid ocean ridge. ***1 Mark***

c) Indicate on your diagram, using the letter **X**, a place where earthquakes would be most likely. ***1 Mark***

30. Compare and contrast oceanic and continental crust. ***4 Marks***

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End of Exam.

Geological Time Scale