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SEMESTER II, 2002

Preliminary Course

EARTH AND ENVIRONMENTAL SCIENCE

2 UNIT

TIME ALLOWED: 2 ¼ 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 this page to answer the questions.**
- * **SECTION B** – Short Answer and Longer Response questions. All answers are to be written in the spaces provided.

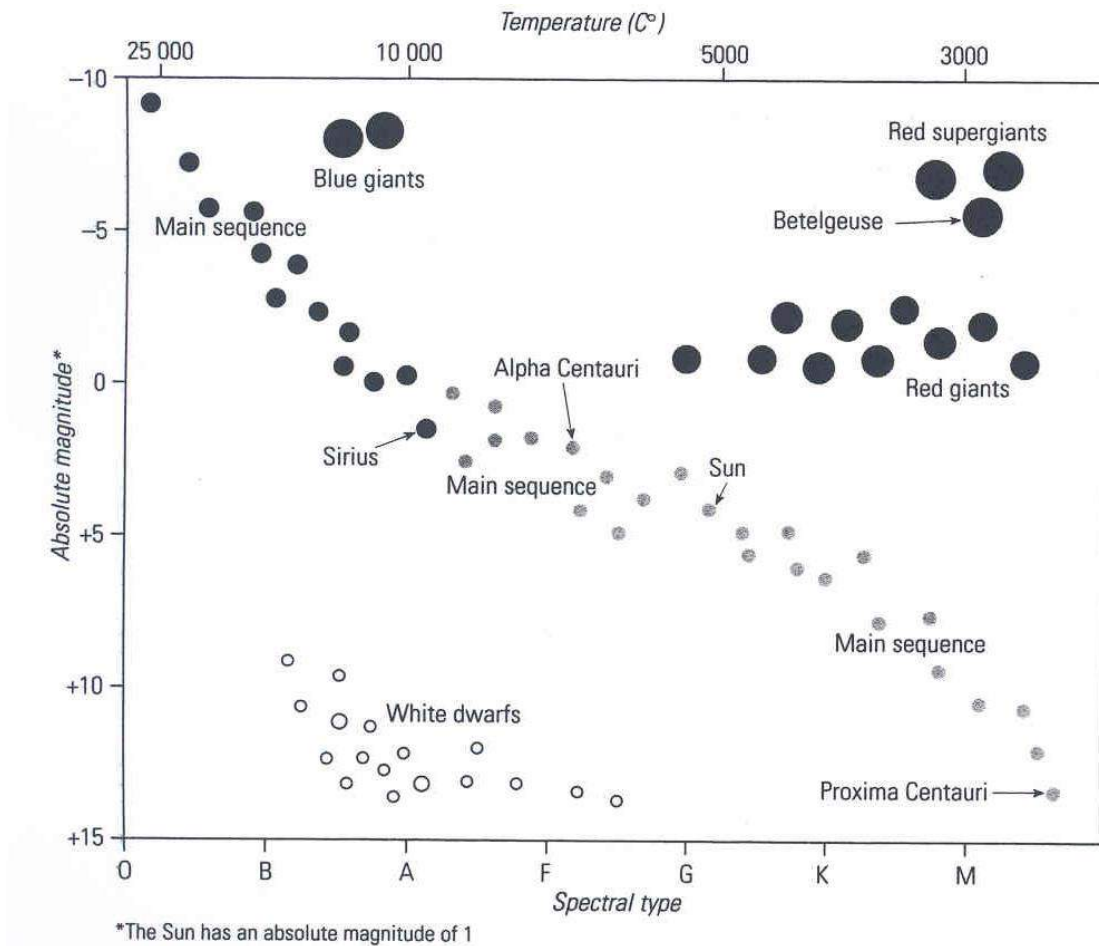
Section A

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.

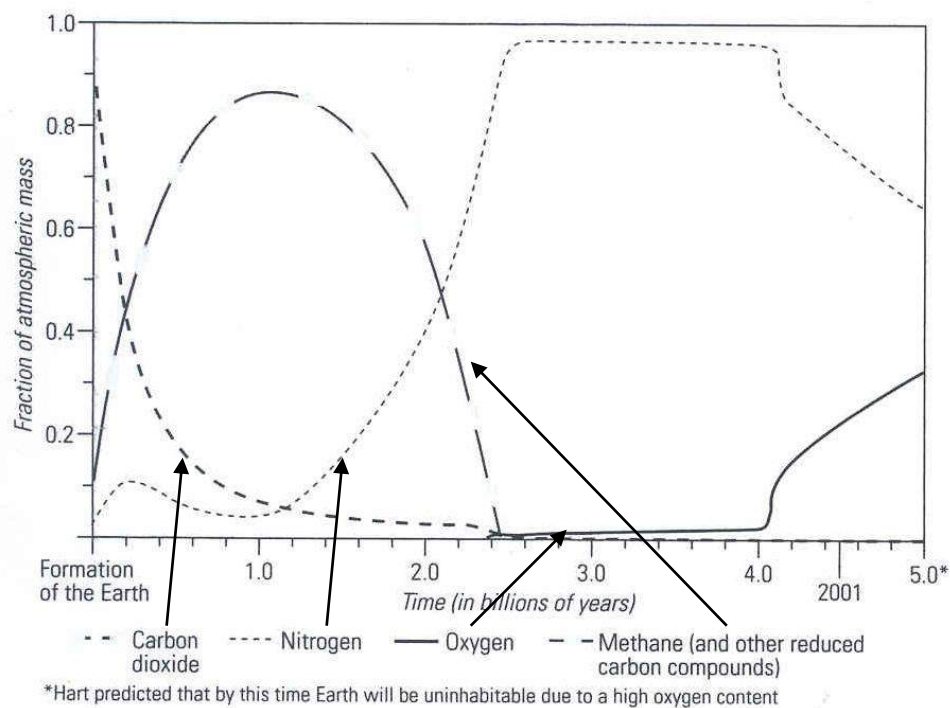
1. The diagram shows the luminosity of stars plotted against their surface temperature in what has been termed a Hertzsprung-Russell diagram.



Which of the following statements describes the majority of stars?

- A giants
- B dwarfs
- C supergiants
- D main sequence stars

- 2 Which piece of evidence, listed below, supports the idea that the universe is expanding?
- A the distance between Sydney and London is increasing
 - B all elements found on Earth are also found in the Universe
 - C light reaching Earth from distant stars is shifted toward the red end of the spectrum
 - D radio waves reach the Earth from distant parts of the galaxy at the same time
3. The diagram below shows Hart's estimates of atmospheric gases throughout Earth history.



Which of the following statements describes the atmosphere when the Earth formed compared to its present atmosphere?

- A higher in oxygen and lower in carbon dioxide
- B lower in oxygen and higher in carbon dioxide
- C lower in both carbon dioxide and oxygen
- D higher in both nitrogen and methane

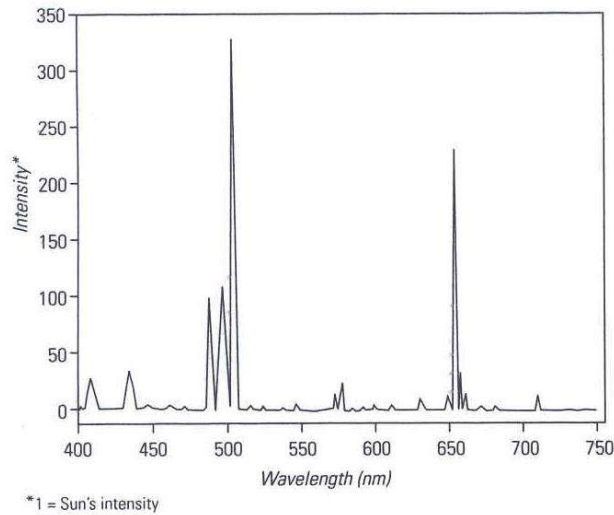
4. Banded Iron Formations are composed of alternating layers of iron-rich material and silica which accumulated in the sea.

Banded iron formations only exist in rocks dating from 1.8 to 2.5 million years ago.

Why are there no banded iron formations recorded in rocks younger than 1.8 million years.

- A high carbon dioxide levels prevents the iron from forming in the sea
- B iron combines with oxygen on land rather than in the sea
- C blue green algae has ceased precipitating iron
- D all the Earth's iron was used up by this time

5. The graph below shows a spectrogram for planetary nebula **ZX1267**



The table below gives the wavelengths of the spectrum of various elements.

Element	Wavelength (nm)	Intensity (Sun = 1)
Helium	402.6	4
Sulfur	406.9	2
Hydrogen	410.1	30
Hydrogen	434.0	50
Oxygen	436.3	2
Helium	447.1	5
Iron	465.8	1
Hydrogen	486.1	100
Helium	492.1	1
Oxygen	495.8	111
Oxygen	500.7	330
Nitrogen	519.9	1
Nitrogen	575.4	13
Helium	587.6	25
Oxygen	630.0	5
Sulfur	631.2	10
Oxygen	636.4	1
Nitrogen	654.8	12
Hydrogen	656.3	230
Nitrogen	658.4	36
Helium	667.8	16
Sulfur	671.6	4
Sulfur	673.0	5
Argon	713.6	10

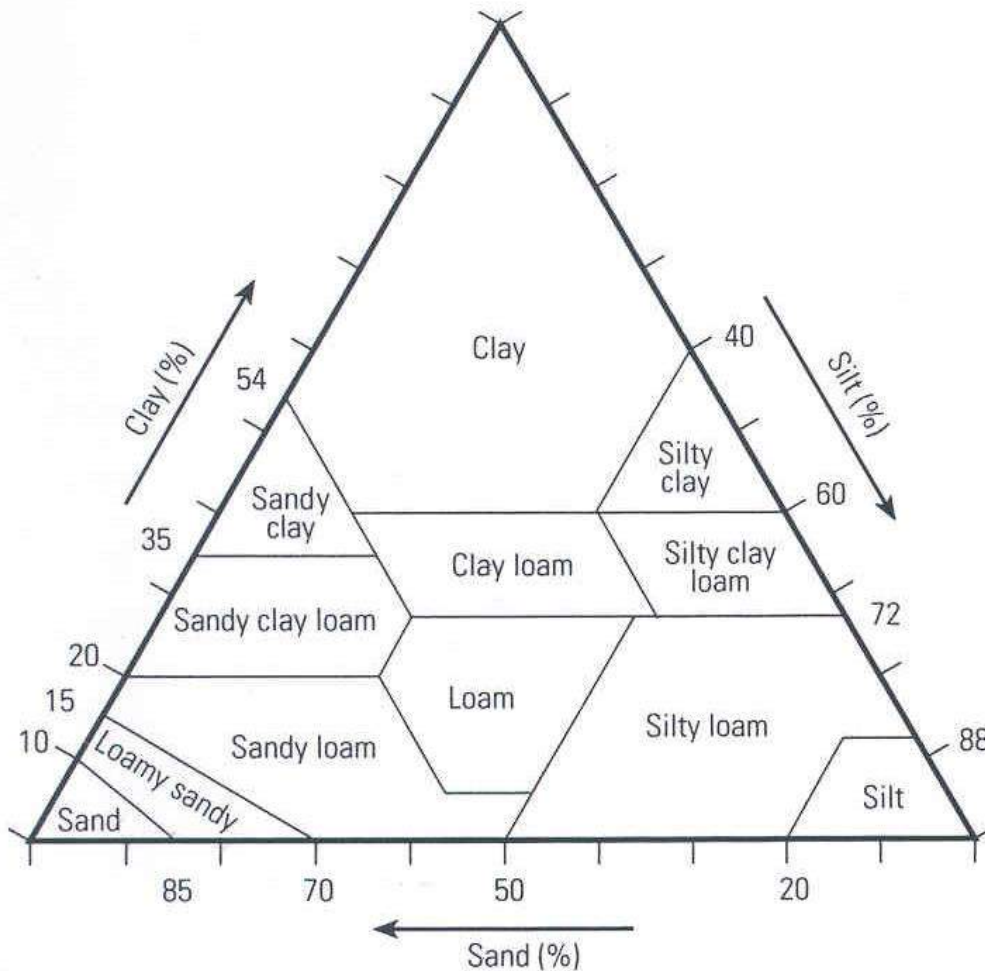
If the intensity is linked to abundance, which element is the most common in Nebula **ZX1267**?

- A Oxygen
- B Hydrogen
- C Sulfur
- D Nitrogen

6. A student analysed the texture of a local soil by sieving and then determining the percentage of each sediment size present in the sample.

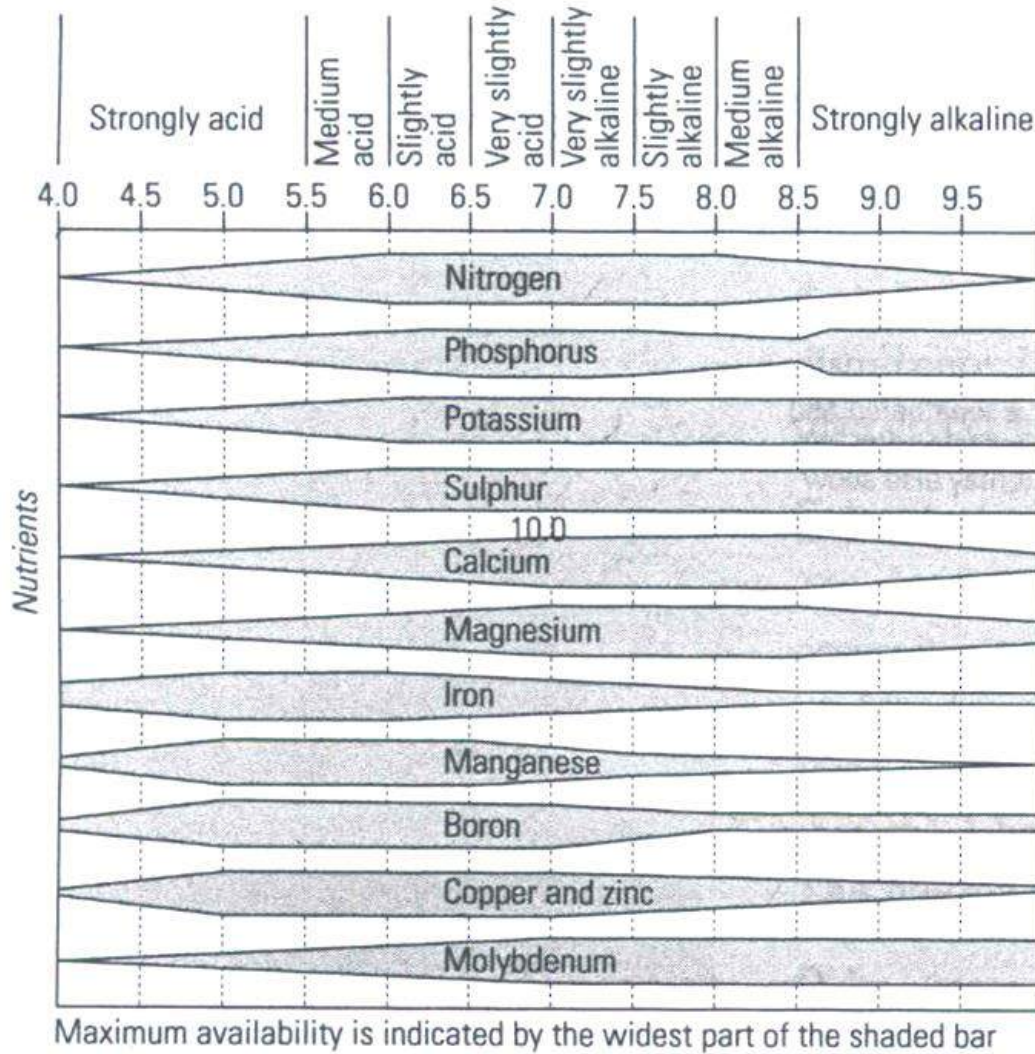
Sediment Size	Percentage
Sand	40
Silt	40
Clay	20

Using the triangular diagram below, what is the soil type they tested?



- A Sandy clay loam
- B Sandy loam
- C Clay loam
- D Loam

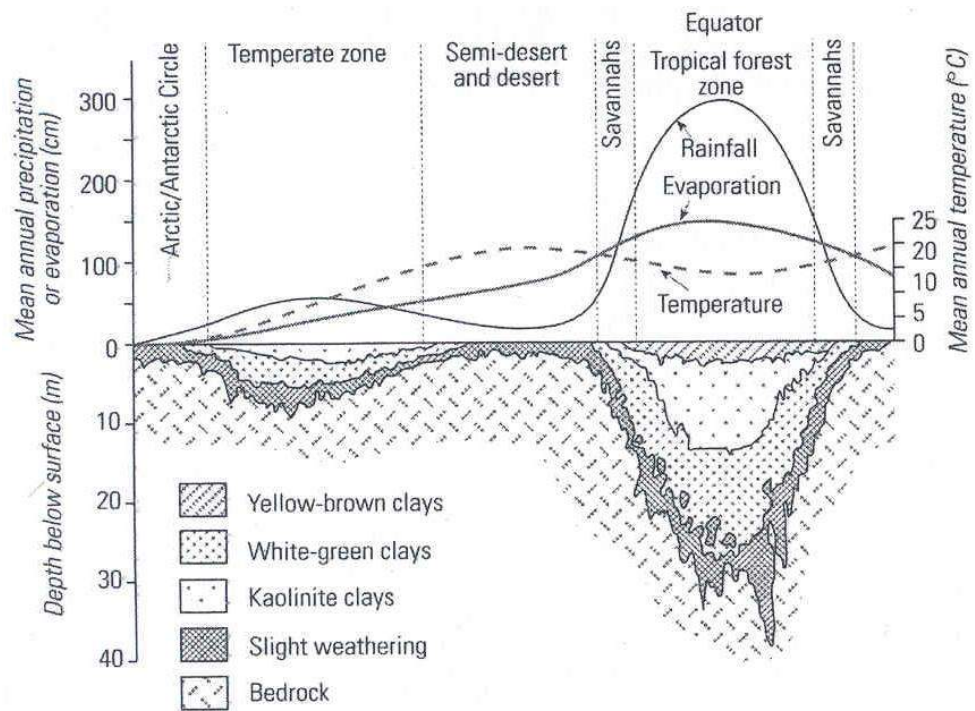
7. The diagram below shows the availability of various nutrients at different pH levels in soil.



What is the pH which would allow the maximum availability of nutrients for plants?

- A 4.5
- B 5.5
- C 7.5
- D 8.5

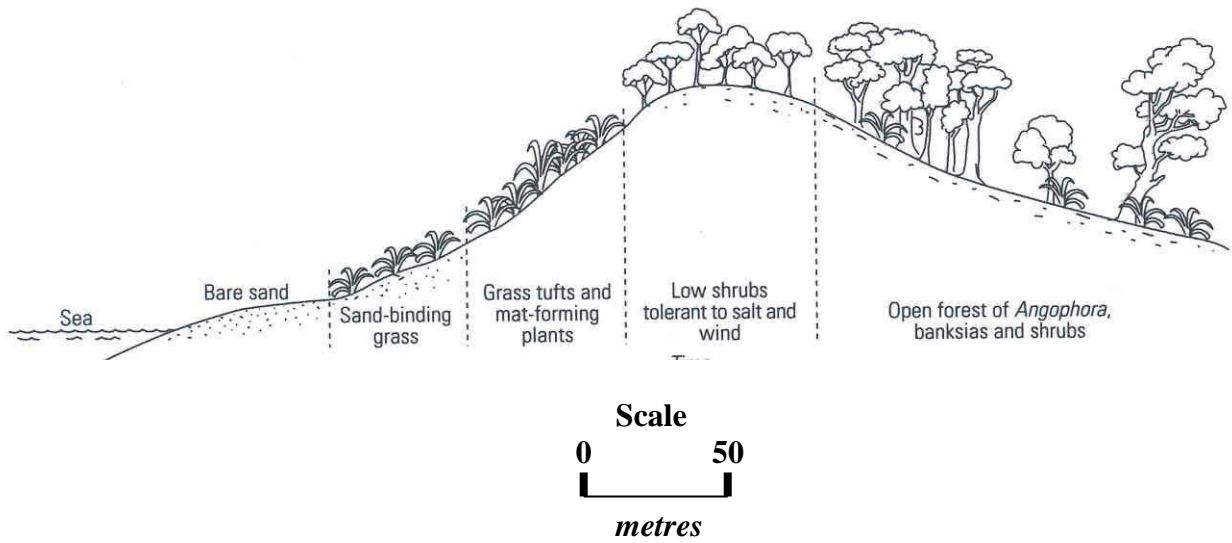
8. The diagram below shows how latitude, climate and soil formation are related.



What factors would combine to produce a deep soil?

- A high temperature and low rainfall
- B moderate rainfall, evaporation and temperature
- C high temperature, low rainfall and moderate evaporation
- D high rainfall, high evaporation and moderate temperature

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

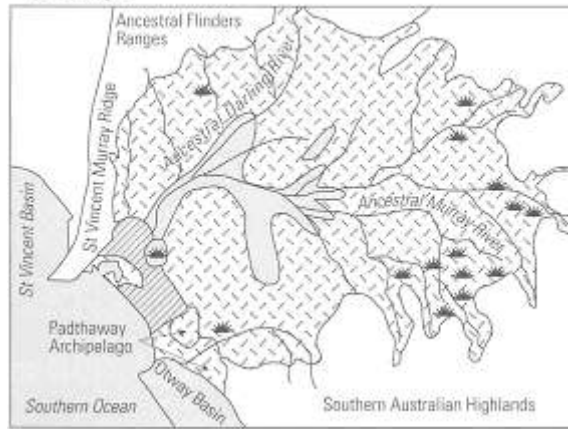


- What factor could result in the succession of plants on the dune?
- A altitude
B movement of salt away from the sea
C increased rainfall away from the coast
D increased soil nutrients and carbon content away from the sea
10. What is an example of an ecologically sustainable practice?
- A Irrigating land adjoining the Nepean River to increase crop yields
B Logging old growth eucalypt forests near Eden in Southern NSW
C Establishing biosphere reserves in urban areas like Wamberal
D Removing weeds from farms in Central Western NSW

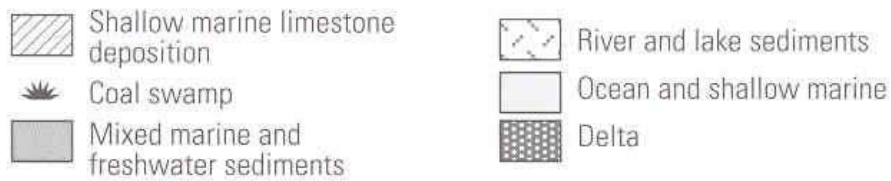
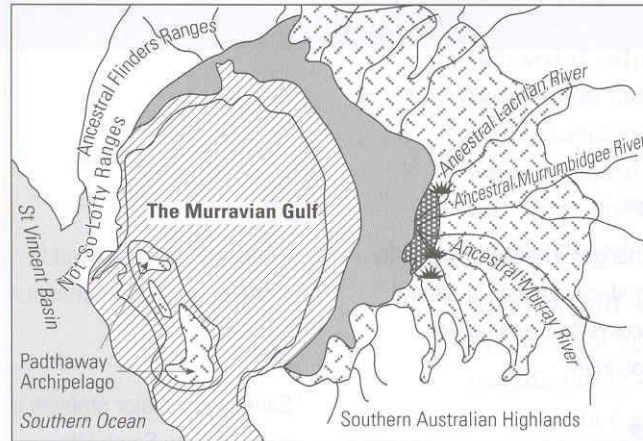
11. As water temperature increases, how do the levels of dissolved oxygen and carbon dioxide change?
- A oxygen increases and carbon dioxide decreases
 - B oxygen decreases and carbon dioxide increases
 - C oxygen and carbon dioxide both decrease
 - D oxygen and carbon dioxide both increase
12. Which common pollutants can lead to the explosive growth of algae in rivers?
- A potassium and nitrates
 - B nitrates and phosphorus
 - C phosphorus and potassium
 - D carbon dioxide and potassium
13. What evidence suggests that warm shallow seas existed in the past?
- A Palaeozoic limestone deposits
 - B dinosaur fossils in Jurassic rocks
 - C Permian and Triassic coal deposits
 - D asymmetrical ripple marks in Triassic sedimentary rocks
14. Where are most of the Earth's fresh water supplies?
- A Stored in lakes on continents
 - B contained in ice caps at the poles
 - C Held as water vapour in the atmosphere
 - D stored as underground water in rocks on continents

15. Refer to the diagram below which shows the Murray – Darling Basin at two different times in the past

a. Late Eocene to Early Oligocene epochs, 40 to 30 million years ago



b. Early Miocene epoch, 24 to 16 million years ago



What environmental changes are represented at the times shown by the maps.

- A terrestrial to marine
- B marine to marine
- C terrestrial to terrestrial
- D marine to terrestrial

Name:

Section B

Questions 15 to 29 (Total 60 Marks)

Write your answers in the appropriate space on this paper.

4

16. The 'Big Bang' theory and the 'Steady State' theory are two hypotheses that explain the existence of matter in the universe. **4 marks**

Compare these two theories by using **ONE** similarity and **ONE** difference.

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

4 marks

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19. Outline the role of chemosynthesis in providing a suitable energy source for early organisms.

4 marks

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20. Describe the effect of photosynthesis on the Earth's atmosphere.

2 marks

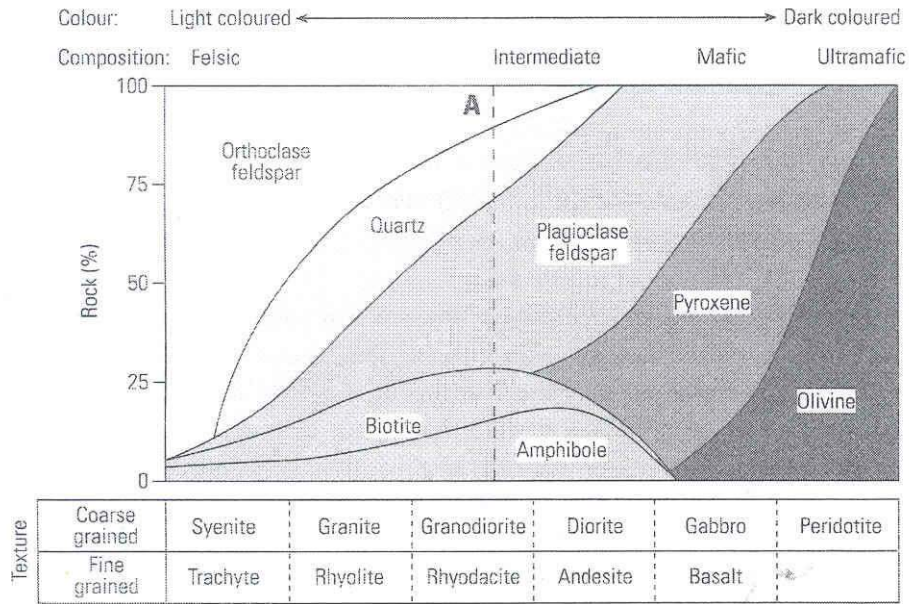
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21. The diagram below shows the classification of igneous rocks by texture and composition.



A Give the percentage composition of granodiorite represented by the line 'A'. 2 marks

Mineral	% present in Granodiorite
Orthoclase	
Quartz	
Plagioclase	
Biotite	
Amphibole	

B Describe the conditions in which granodiorite forms giving a reason for your answer. 2 marks

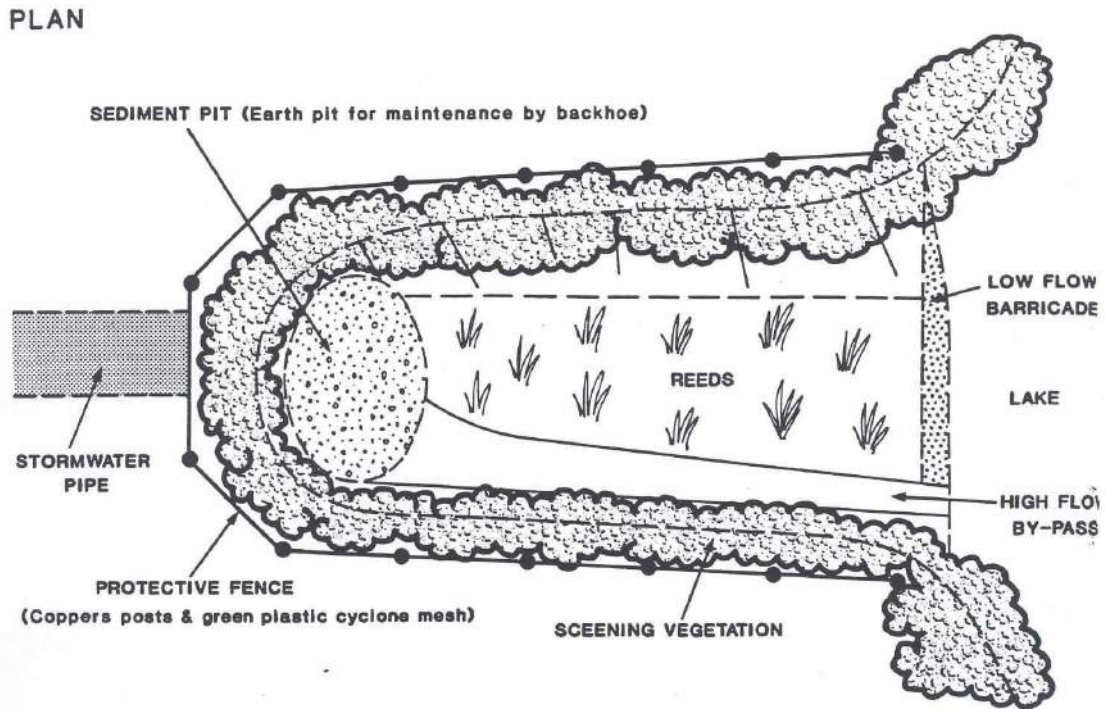
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23. The diagram shows an artificial structure used to reduce the impact of urban development on natural ecosystems.



A Identify the structure.

1 mark

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B Describe how the structure reduces the impact of the built environment on the natural environment.

2 marks

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24 In your Earth and Environmental Science course you have used secondary sources including library resources, internet and media to provide information on various topics.

Using information gathered from secondary sources -

A. Explain why one specific Australian species has become endangered. **3 marks**

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B. Evaluate the measures being undertaken to ensure this species survival. **3 marks**

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25. Outline one implication of the global loss of biodiversity. **2 marks**

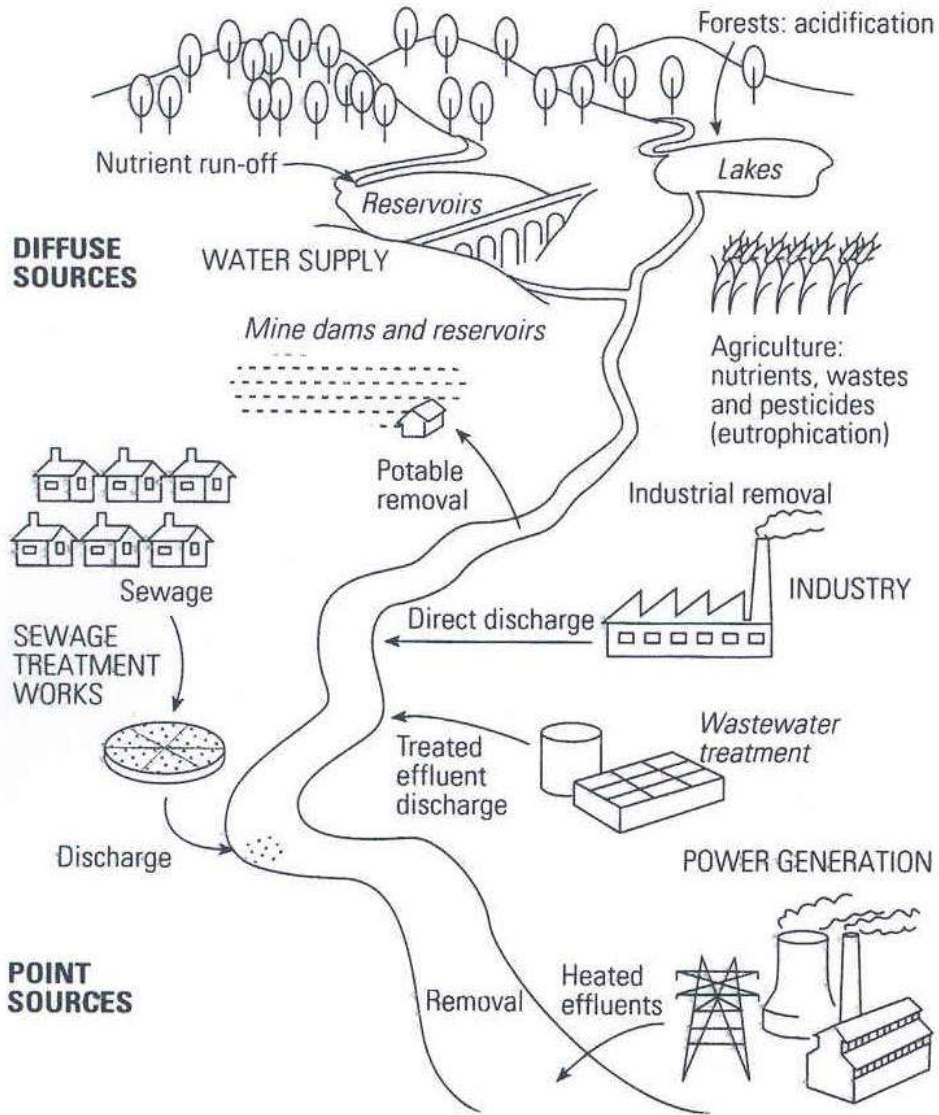
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26. Refer to the diagram below which shows sources of pollution in a river system.



A Identify one specific source of pollution from the diagram.

1 mark

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B Explain the effect of the source of pollution you have identified on the river system.

2 marks

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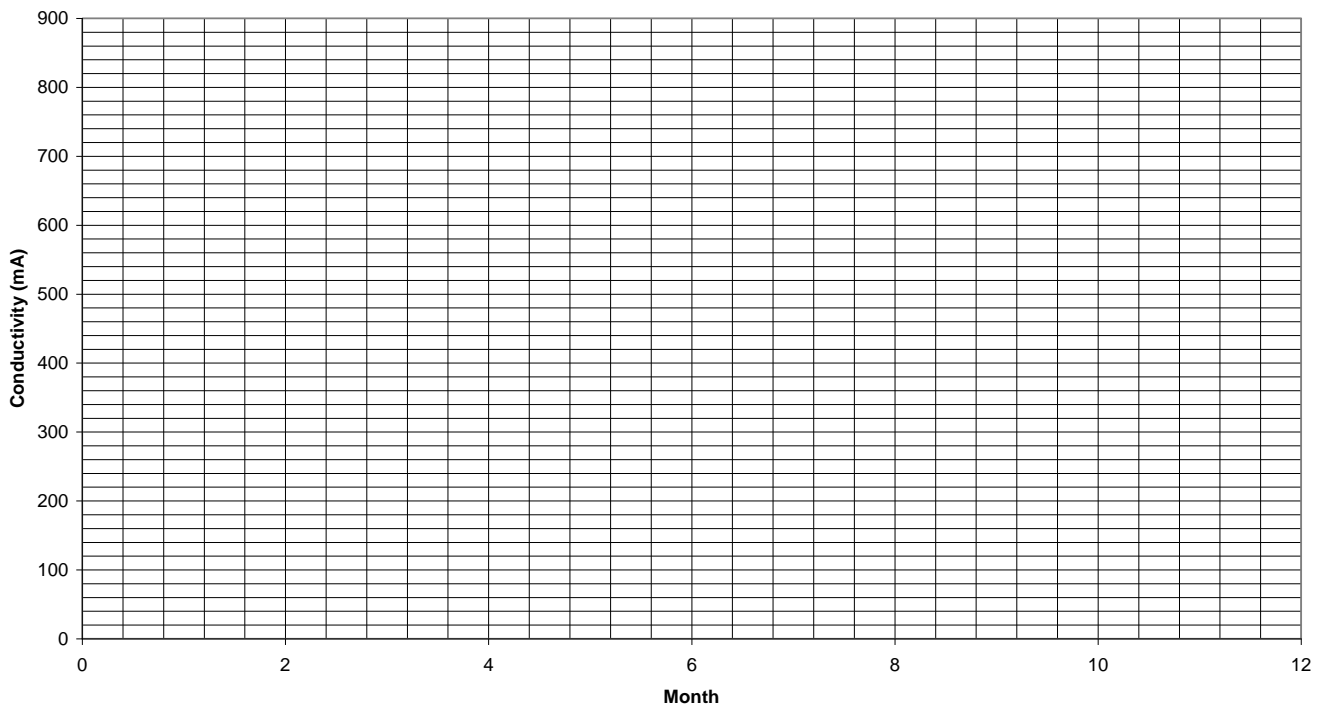
28. The table below shows the electrical conductivity of water at one location along the Lachlan River in NSW over a number of months

Month	Month Number	Electrical Conductivity (mA)
February	2	620
April	4	760
June	6	800
August	8	180
October	10	380

A Draw a line graph using this data.

2 marks

Electrical Conductivity of River Water



B Suggest a possible cause for the conductivity of the river water.

2 marks

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C Give a possible reason for the low value in August.

1 mark

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29. A Identify two factors that can affect the global distribution of water. *2 marks*

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B Explain how one of these factors influences the distribution of water. *2 marks*

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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

Geological Time Scale

	EON	ERA	PERIOD	EPOCH		
0	Phanerozoic	Cenozoic	Quaternary	Holocene ↘		
2				Pleistocene		
5			Tertiary	Miocene	Pliocene	
10					Oligocene	
20						Eocene
30						
40					Palaeocene	
50			Mesozoic	Cretaceous	Jurassic	
60						Triassic
70						
100	Palaeozoic	Permian		Carboniferous		
200					Devonian	
300						Silurian
400	Ordovician	Cambrian	Cambrian			
500						
600	Proterozoic	Archaean	Archaean	Archaean		
1000						
2000						
3000						
4000	Hadean	Hadean	Hadean	Hadean		