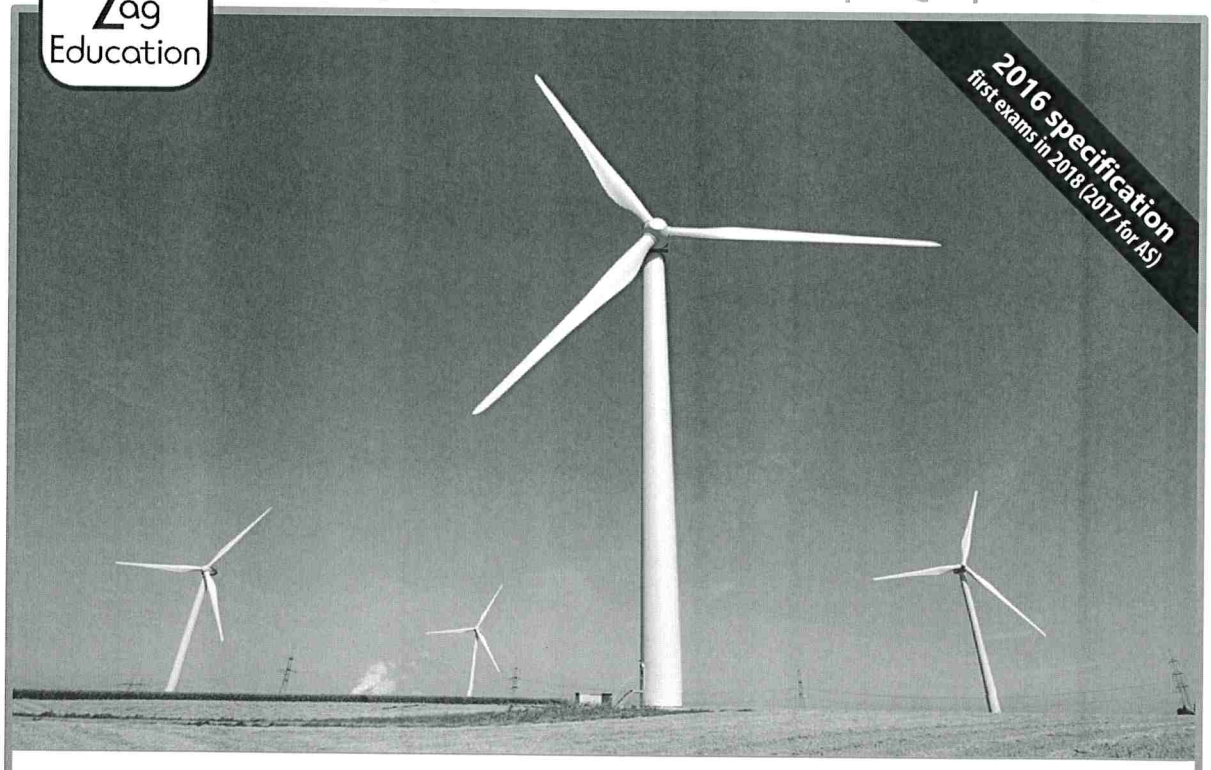
Zig Zag Education

Geography

AS/A Level | AQA | 7036/7037



Topic Tests for AS and A Level AQA Geography:

Water and Carbon Cycles

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POD 7252

Test 1 – Systems, Cycles and the Global Stores of Water

1. Explain what is meant by the term 'system'. *2 marks*

2. Suggest why systems are usually simplified. *1 mark*

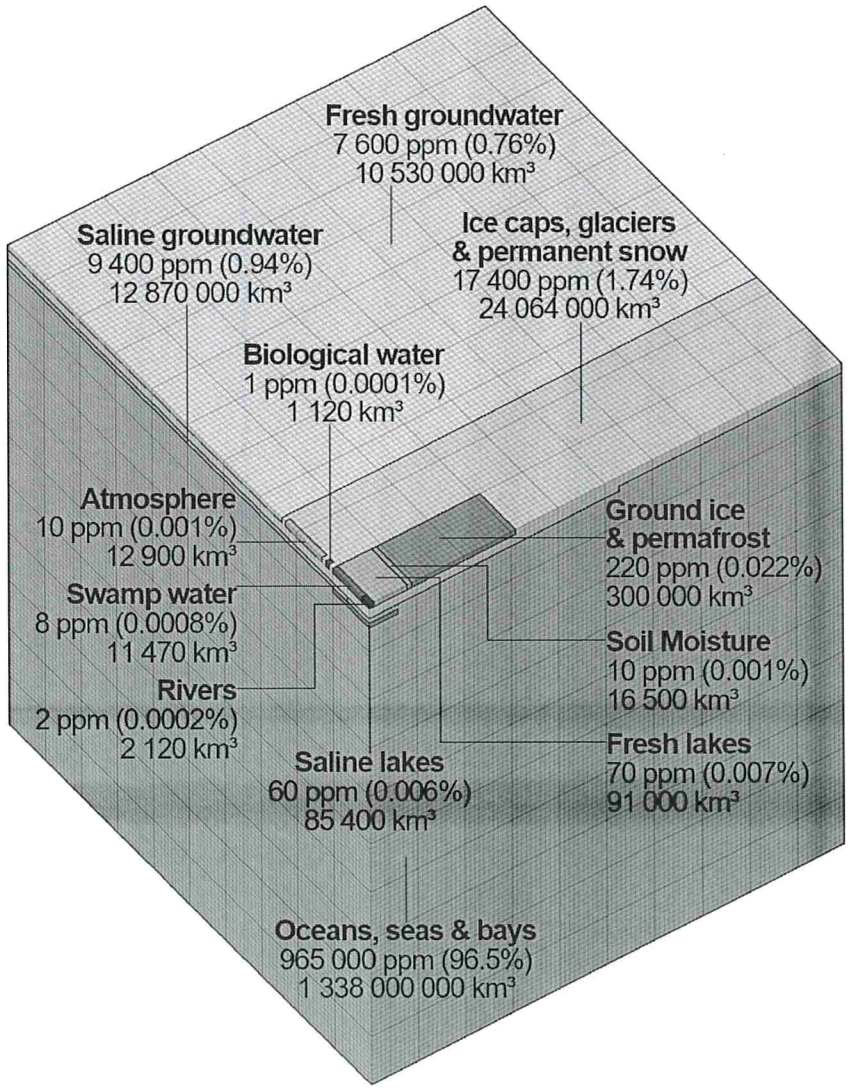
3. Distinguish between the following types of system: *6 marks*

   - Open
   - Closed
   - Isolated

4. Outline what is meant by positive and negative feedback cycles. *3 marks*

5. Give an example of either a natural positive or negative feedback cycle, and briefly explain why the example shows a positive or negative cycle. *3 marks*

6. Using the diagram below, comment on the distribution of water that is consumable and accessible to humans. *4 marks*



7. Assess the importance of **either** wetlands **or** groundwater **or** soil water, to people and the biosphere.

3 marks

8. Assess the importance of water to life on Earth. *4 marks*

9. Outline why the pH of the oceans has reduced over the past 250 years. *3 marks*

10. Discuss the different components of the cryosphere. *5 marks*

11. Examine the causes of rainfall. *6 marks*

Total Marks: 40

Extension Questions

12. Explain the importance of permafrost in controlling global temperatures. *4 marks*

13. A number of systems occur on Earth. Assess whether the systems are open or closed. *6 marks*

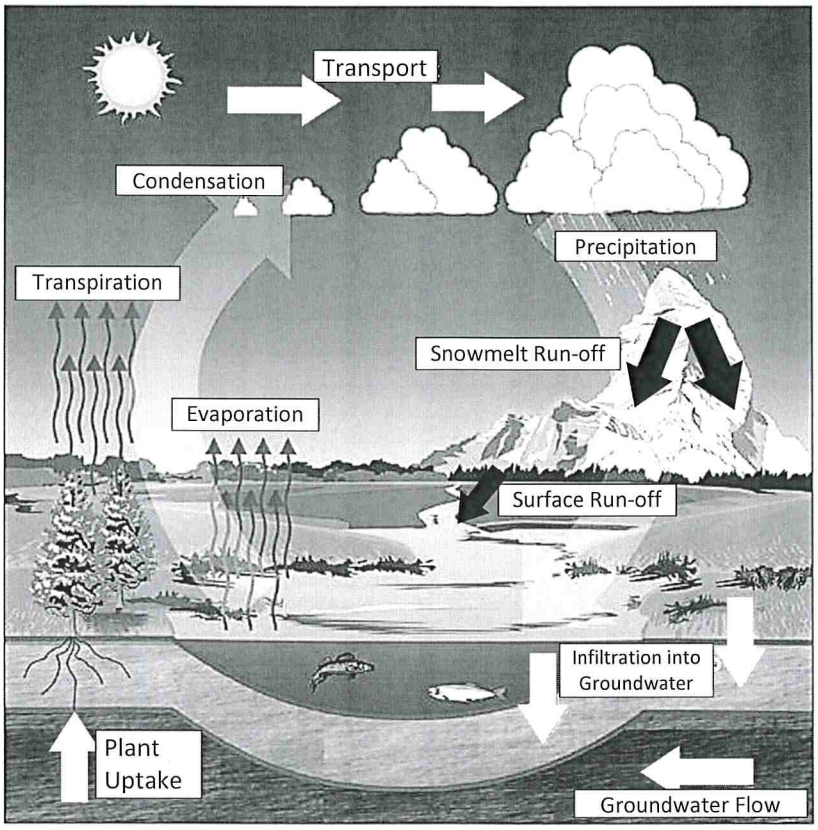
Extension Marks: 10
Total Marks: 50

Test 2 – The Water Cycle – Drainage Basins and Run-off

1. Define what is meant by the term 'drainage basin'. *2 marks*

2. Give **two** examples of stores and **two** examples of flows within a drainage basin.

   You may use this diagram of the water cycle to help you. *2 marks*



3. Suggest how soil infiltration rate could be increased. *2 marks*

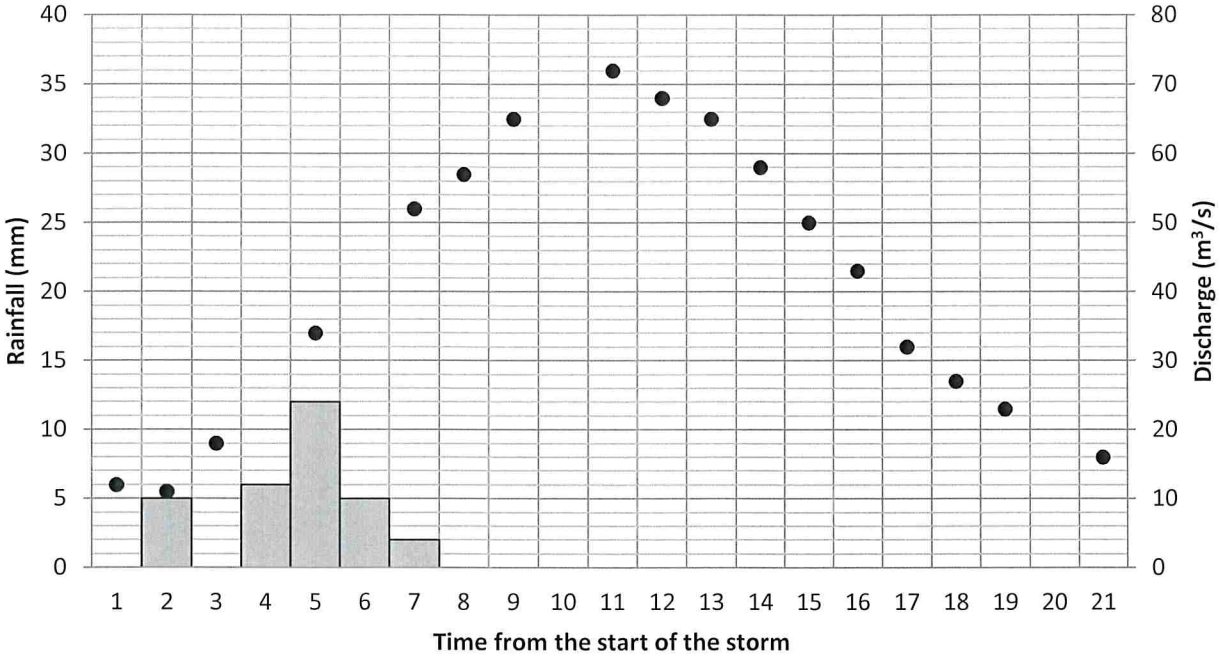
4. Identify two factors which increase the likeliness of overland flow. *2 marks*

5. Suggest why potential evapotranspiration is likely to be low on a very cold day, or a very hot and humid day. *4 marks*

6. Give a definition for a 'river regime', and state two reasons why a river's regime will alter throughout the year. *4 marks*

7. Describe how the soil water budget is likely to change throughout the year (for a location in the UK). *4 marks*

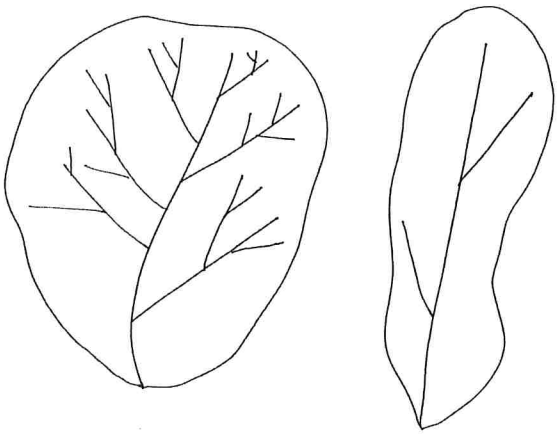
8. Using the data table below, complete the hydrograph and add a curved line through the points. *6 marks*



Time from start of the storm	Rainfall (mm)	Discharge (m^3/s)
0	0	12
1	5	11
2	7.5	18
3	6	28
4	12	34
5	5	43
6	2	52
7	0	57
8	0	65
9	0	68
10	0	72
11	0	68
12	0	65
13	0	58
14	0	50
15	0	43
16	0	32
17	0	27
18	0	23
19	0	18
20	0	16

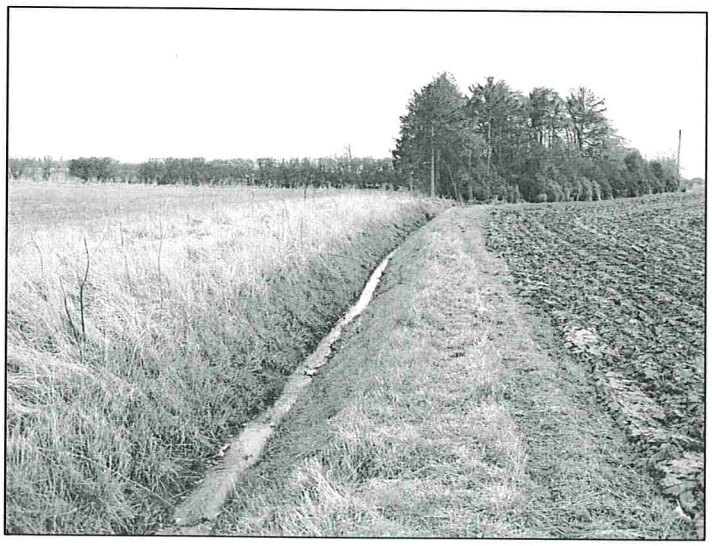
9. Describe and explain how the hydrograph could be affected if the catchment became more urbanised. *4 marks*

10. State which of the drainage basins will have the 'flashiest' hydrograph and explain why. *3 marks*



11. Suggest how engineering feats can alter the flow of a river. *4 marks*

12. Critically assess the advantages and disadvantages of the drainage scheme shown in the photograph below. *5 marks*



Total Marks: 42

Extension Questions

13. Explain how large-scale deforestation can alter rainfall patterns. *4 marks*

14. Assess how groundwater abstraction can cause problems to both humans and the natural world. *6 marks*

Extension Marks: 10
Total Marks: 52

Test 3 – The Carbon Cycle

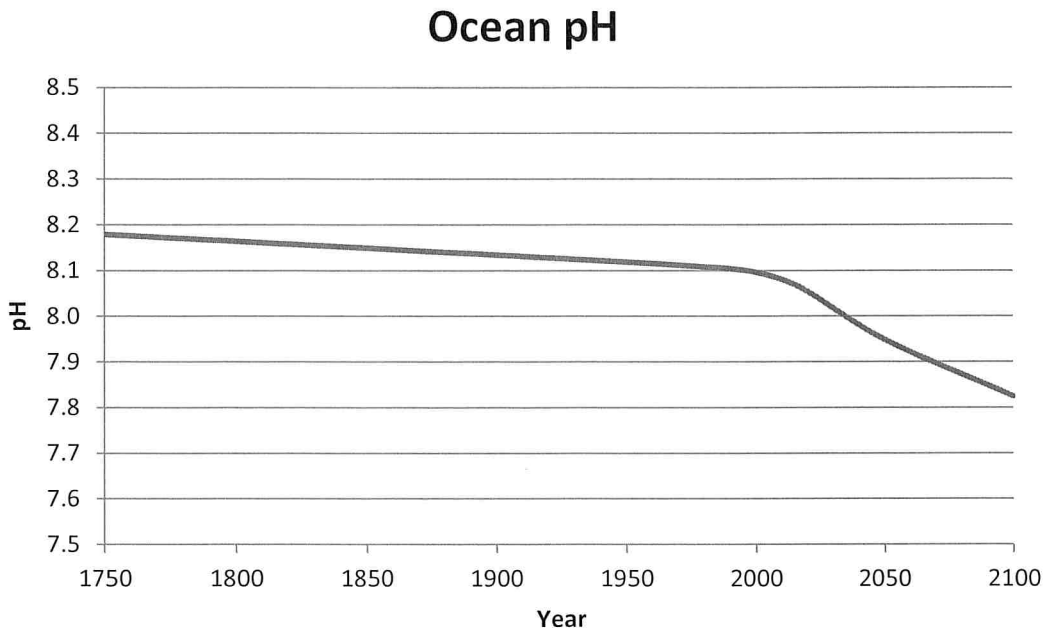
1. Distinguish between stores and fluxes of carbon. *2 marks*

2. Distinguish between organic and inorganic carbon. *2 marks*

3. Identify **two** sources of carbon in the lithosphere. *2 marks*

4. Choose two sources of carbon stored in the lithosphere, and explain how they were formed. *4 marks*

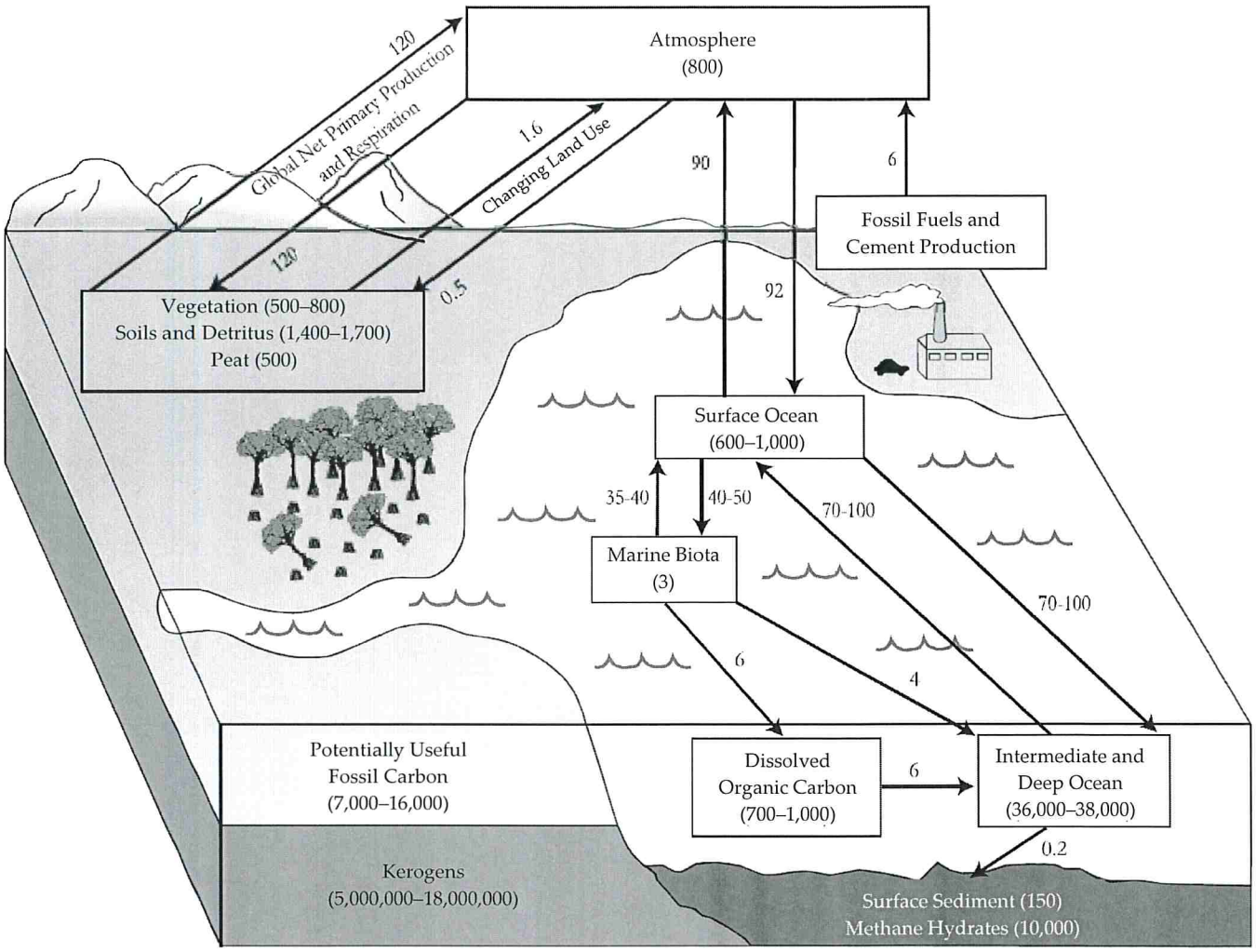
5a. Study the graph below. Describe and explain the trend. *3 marks*



5b. Using this data, comment on whether the ocean is a sink or a flux of carbon. *2 marks*

6. Identify a source of carbon in the cryosphere. *1 mark*

7a. Using the diagram below, comment on the proportions of carbon in the biosphere. *3 marks*

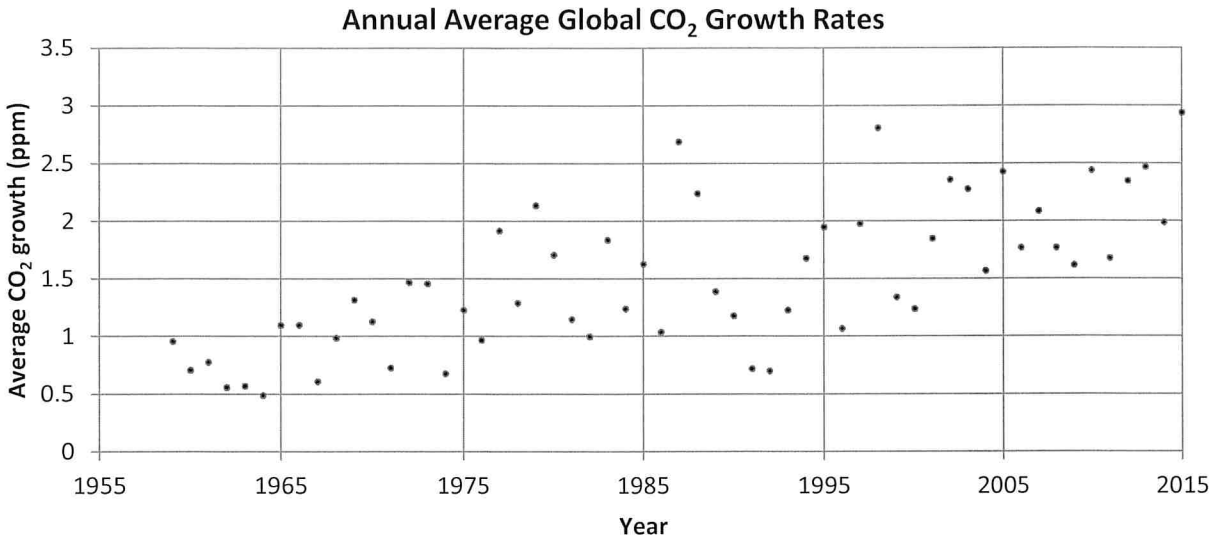


NB Stores are denoted in brackets (in billions of metric tons), flows are next to the arrows (in billions of metric tons per year).

7b. Explain how carbon enters and exits the biosphere. *4 marks*

8. To what extent are animals both stores and producers of carbon? *2 marks*

9a. Study the graph below and add a line of best fit through the data. *1 mark*



Source: Ed Dlugokencky and Pieter Tans, NOAA/ESRL (www.esrl.noaa.gov/gmd/ccgg/trends/)

Average increase 1.5 ppm per year. The first year when data is recorded is 1959.

9b. Describe and explain the trend shown on the graph. *3 marks*

9c. Using the average yearly increase, calculate how CO_2 concentration has increased in the atmosphere. *2 marks*

10. Explain how photosynthesis respiration are opposites, yet there is an imbalance between the two. *4 marks*

11. Assess the role of decomposers in the health of soil. *3 marks*

12. Explain how the oceanic (**not** biological) carbon pump works. *4 marks*

13. Study the following equation:

calcium carbonate + acid → calcium salt + water + carbon dioxide

Give a name for this process, and explain how the process adds to atmospheric carbon. *3 marks*

Total Marks: 45

Extension Questions

14. Explain whether living or dead plant material is more beneficial as a carbon store. *4 marks*

15. Assess the importance of atmospheric carbon to life on Earth. *6 marks*

Extension Marks: 10

Total Marks: 55

Test 4 – Changes to the Carbon Cycle and Carbon Budgets

1. Give two ecosystems where normal wildfires are expected. *2 marks*

2. Explain how a forest can either be a source or sink of carbon. *4 marks*

3. Suggest why older forests act as a sink of carbon. *2 marks*

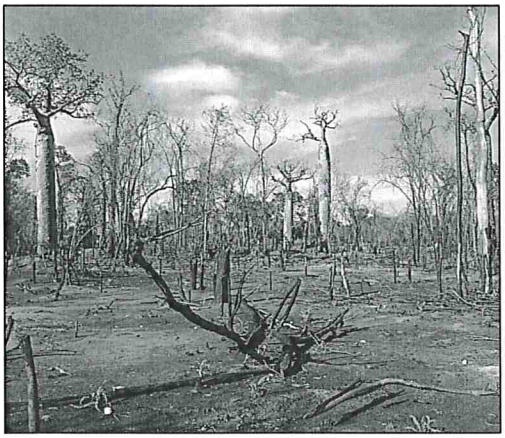
4a. Suggest the importance of **current** volcanic activity as a source of atmospheric CO_2. *2 marks*

4b. Explain why volcanoes cause both warming and cooling. *2 marks*

5. Study the extract below, and explain why the statements made can be true: *6 marks*

> *Ploughing releases carbon into the atmosphere and depletes the micro-organisms which enrich the soil. Eventually it will lead to crop failure, soil erosion and in extreme cases, famine.*
>
> *Source: The Global Plant Council*

6a. Study the image below and copy and complete the table. *7 marks*



The image shows:		
This method releases carbon because:		
Some carbon can be restored because:		

6b. Suggest one advantage of the second method. *1 mark*

7. Study the two images below. The first image shows an area of rainforest in 1970. The second shows the same area in 2016. Suggest how the changes in land use have modified the carbon budget. *6 marks*

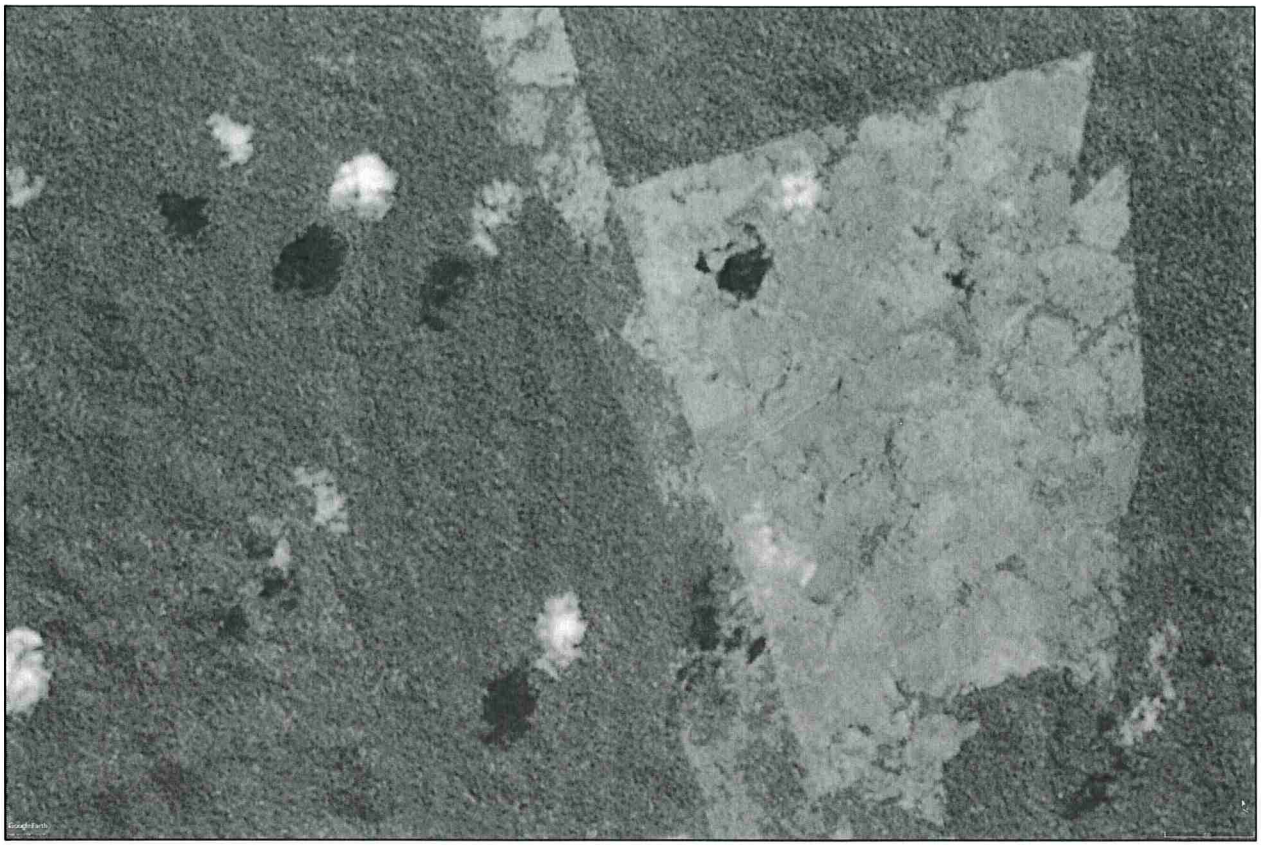


Image 1: 1970. Google Earth: Image from US Geological Survey

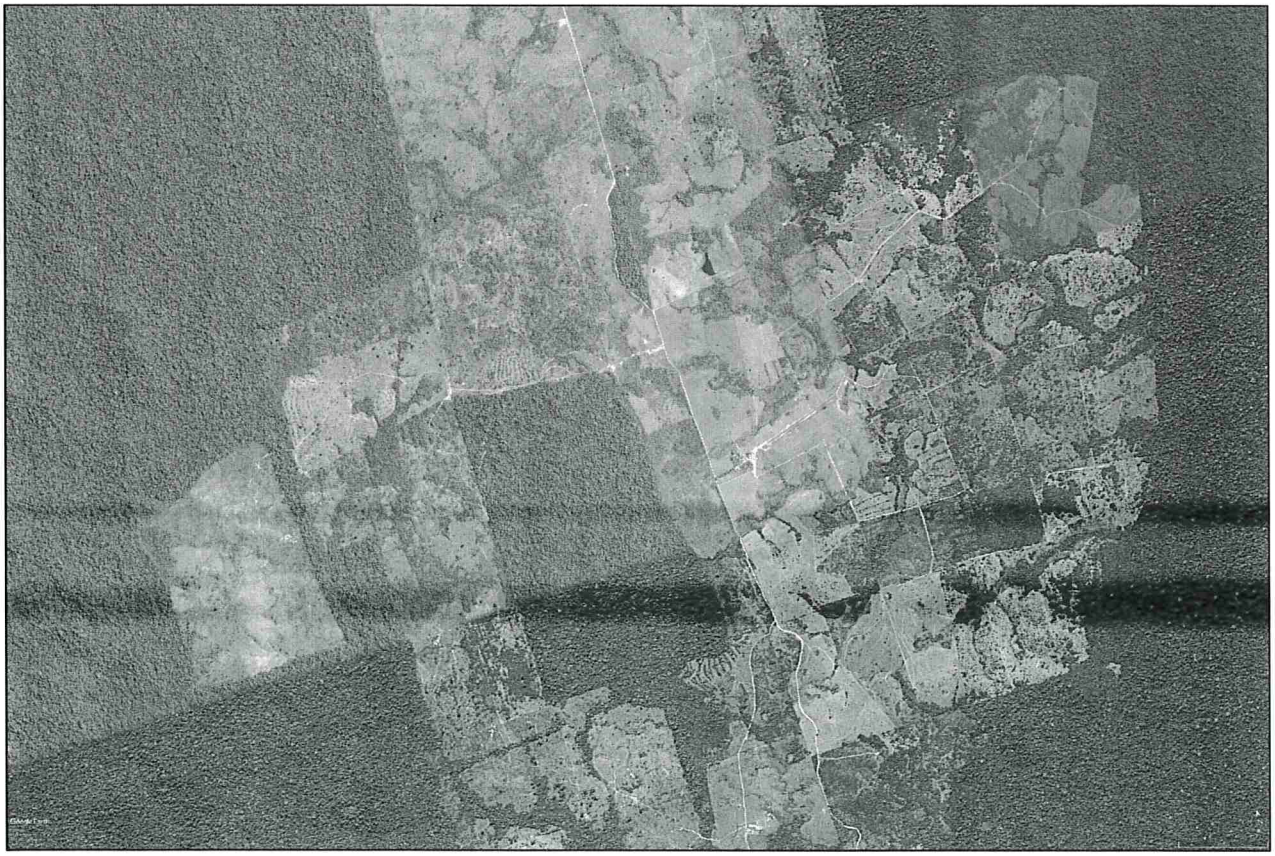


Image 2: 2016 Google, © 2016 Cnes/Spot Image, Image © 2016 Digital Globe, Image © 2016 CNES / Astrium

8. Discuss how humans are affecting oceanic life by increasing atmospheric CO_2 levels. *6 marks*

9. Determine the causes of sea level rise. *2 marks*

Total Marks: 40

Extension Questions

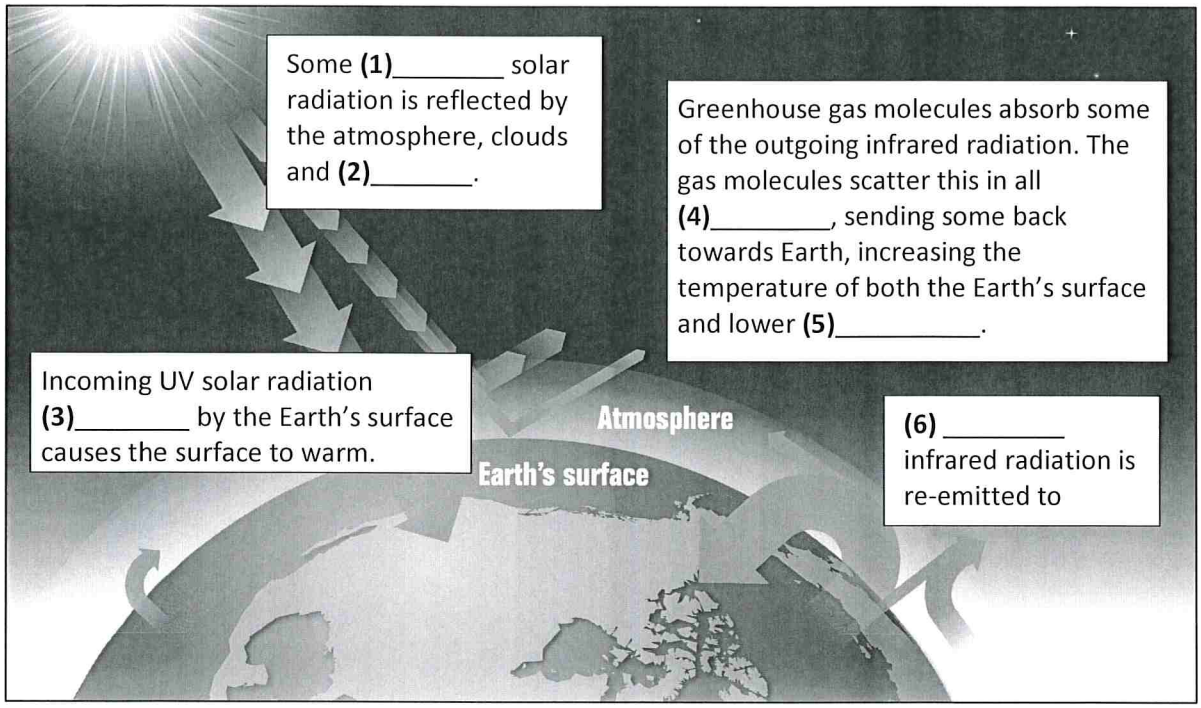
10. Explain how the carbon cycle is prone to positive feedback cycles. *4 marks*

11. Assess the ways that humans have altered the carbon budget. *6 marks*

Extension Marks: 10
Total Marks: 50

Test 5 – Climate Change

1. Use the words below the diagram to complete the boxes on the diagram. *3 marks*



atmosphere	absorbed	aerosols
directions	incoming	longwave

2. Explain how 'radiative forcing' warms the Earth's atmosphere. *3 marks*

3. Suggest how land use change can alter the **albedo** of that surface. *3 marks*

4a. State what is meant by the term 'carbon capture and storage' (often abbreviated as CCS). *2 marks*

4b. Provide **two** advantages and **two** disadvantages of CCS. *4 marks*

5. Copy and complete the table and for each farming type, outline how the following improvements in farming practices can increase stored carbon. *6 marks*

Cropland	**Reduction of ploughing**	
	Increased use of manure	
Grassland	**Irrigation**	
	Ensuring no overgrazing	
Forest cover	**Planting orchards**	
	Reforestation	

6. For **each** of the following ideas, identify **one** form of climate change mitigation.

   - Urban design or waste
   - Building design
   - Energy generation

   3 marks

7. Using **either** an example of a tropical rainforest **or** a river catchment, assess the human influence on the landscapes.

   You may refer to environmental change and human activity in your chosen rainforest; and precipitation, water supply and/or flooding for your chosen river catchment. *6 marks*

Total Marks: 30

Extension Question (AS Level)

8. Evaluate the implications of human modification of natural cycles. *9 marks*

Extension Marks: 9
Total Marks: 39

Extension Question (A Level)

8. Assess how the human modification of natural cycles (such as water or carbon) may affect us in the future. *20 marks*

Extension Marks: 20
Total Marks: 50

Test 6 – General

1. While the Earth is usually referred to as a closed system suggest one input and one output of material to and from the Earth. *2 marks*

2. Which type of system is usually thought of as 'unnatural'. *1 mark*

3. Explain the term 'dynamic equilibrium'. *2 marks*

4. Evaluate the usefulness of seawater to humans. *4 marks*

5. Discuss the accessibility of water stores. *4 marks*

6. Assess the damage caused by the over-abstraction of groundwater. *4 marks*

7. Explain why the understanding of river regimes can be important to humans. *4 marks*

8. Describe the relative importance of two stores within the carbon cycle. *4 marks*

9. Assess the role of the oceans in carbon sequestration. *4 marks*

10. To what extent is the cryosphere an important sink of carbon. *4 marks*

11. Explain the importance in reducing the effects of climate change. *6 marks*

Total Marks: 39

Extension Questions

12. Explain how humans alter natural systems. *4 marks*

13. Assess the importance of natural systems to human well-being. *6 marks*

Extension Marks: 10
Total Marks: 49