

CANDIDATE  
NAME

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**ENVIRONMENTAL MANAGEMENT**

**8291/11**

Paper 1 Lithosphere and Atmosphere

**May/June 2017**

**1 hour 30 minutes**

Additional Materials: Answer Booklet/Paper

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.  
Write in dark blue or black pen.  
You may use an HB pencil for any diagrams or graphs.  
Do not use staples, paper clips, glue or correction fluid.  
**DO NOT WRITE IN ANY BARCODES.**

Electronic calculators may be used.  
You may lose marks if you do not show your working or if you do not use appropriate units.

**Section A**

Answer **all** questions in this section.  
Write your answers in the spaces provided on the question paper.

**Section B**

Answer **one** question from this section.  
Write your answers on the separate answer paper provided.

At the end of the examination,

1. fasten all separate answer paper securely to the question paper;
2. enter the question number from Section B in the grid.

	For Examiner's Use
<b>Section A</b>	/
1	
2	
<b>Section B</b>	/
<b>Total</b>	

This document consists of **10** printed pages and **2** blank pages.

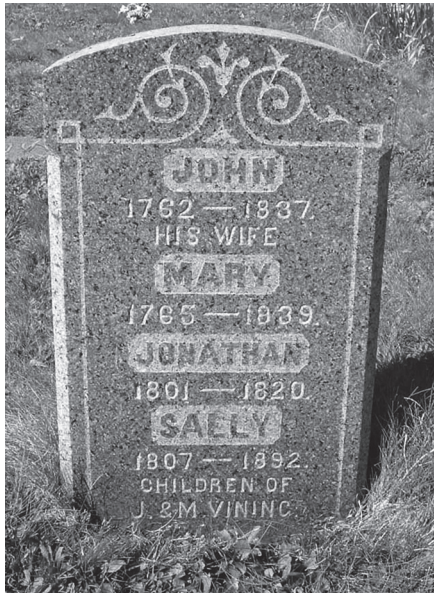
Section A

Answer **all** questions in this section.

Write your answers in the spaces provided.

- 1 (a) Fig. 1.1 shows two stone memorials that have been weathered over time. Memorial A is made of igneous rock and memorial B is made of sedimentary rock.

memorial A



memorial B

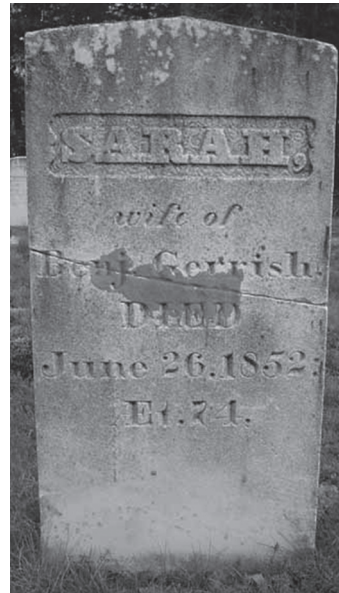


Fig. 1.1

- (i) State what is meant by the term *weathering*.

.....  
.....  
.....  
.....[2]

- (ii) With reference to Fig. 1.1, state **three** pieces of evidence that suggest the memorials have been weathered.

.....  
.....  
.....  
.....  
.....  
.....[3]

(iii) With reference to Fig. 1.1, explain how rock type may affect the rate of weathering.

.....  
.....  
.....  
.....  
.....  
.....  
.....[3]

(iv) Explain **two** factors, other than rock type, that may cause differences in the rate of weathering of stone memorials.

.....  
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.....[4]

(b) Fig. 1.2 shows the effects of recent mass movement on a slope.

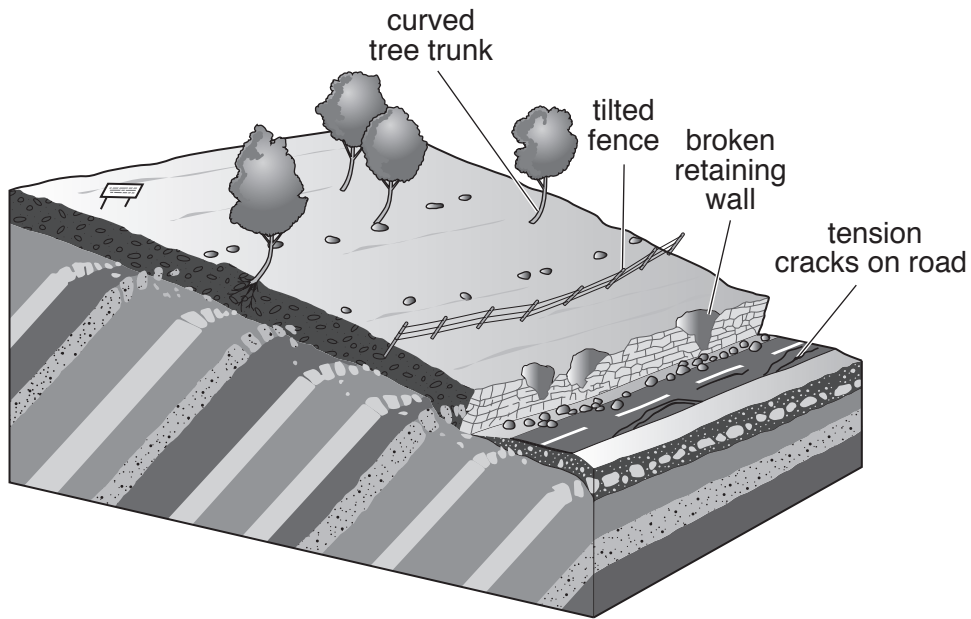


Fig. 1.2

(i) State the type of mass movement shown in Fig. 1.2 and explain how it occurs.

type of mass movement .....

explanation .....

.....  
.....  
.....  
.....  
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[4]

(ii) Describe **two** methods to manage mass movements.

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[4]

[Total: 20]

2 (a) Fig. 2.1 shows some characteristics of the troposphere.

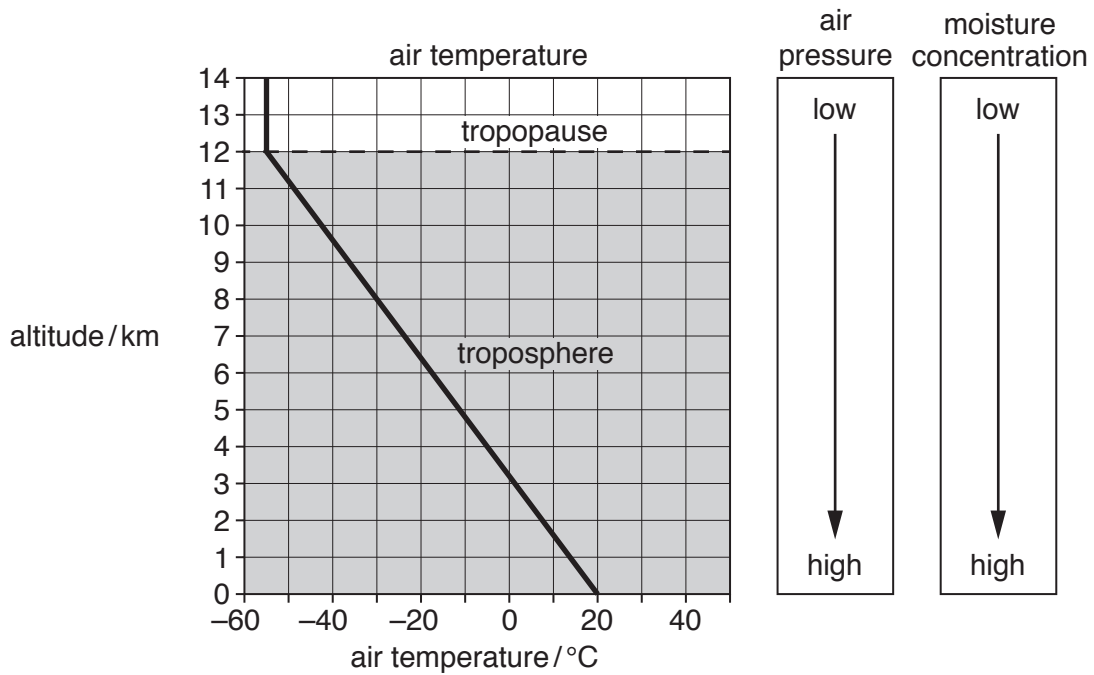


Fig. 2.1

(i) State the air temperature at the tropopause.

..... °C [1]

(ii) Calculate the rate, as shown in Fig. 2.1, at which air temperature falls with altitude (the environmental lapse rate) in the troposphere.

Show your working.

..... °C per km [2]

(iii) Suggest **two** reasons why moisture concentrations in Fig. 2.1 are higher in the lower part of the troposphere.

.....  
 .....  
 ..... [2]

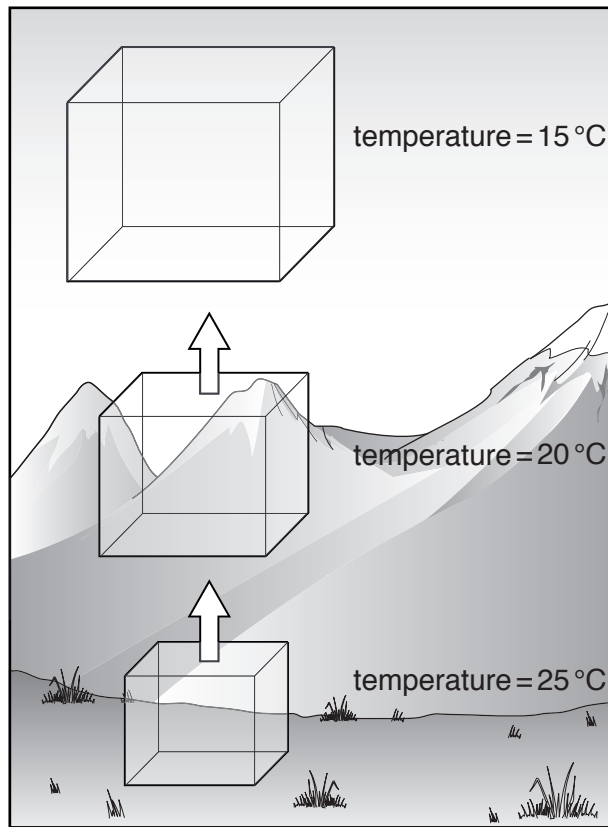
(iv) Explain why air pressure decreases with an increase in altitude, as shown in Fig. 2.1.

.....  
 ..... [1]

(v) Describe the chemical composition of air in the troposphere.

.....  
.....  
.....  
.....[2]

(b) Fig. 2.2 is a diagram showing the volume of a fixed amount of air (a parcel of air) at different altitudes in the lower part of the troposphere.



(not to scale)

**Fig. 2.2**

(i) With reference to Fig. 2.2, describe what happens to the volume and to the temperature of the parcel of air as it reaches higher altitudes.

.....  
.....  
.....  
.....[2]

(ii) Suggest **two** reasons why a parcel of air might be forced to rise as shown in Fig. 2.2.

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.....[4]

(c) Explain why weather can be hazardous for people.

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.....[6]

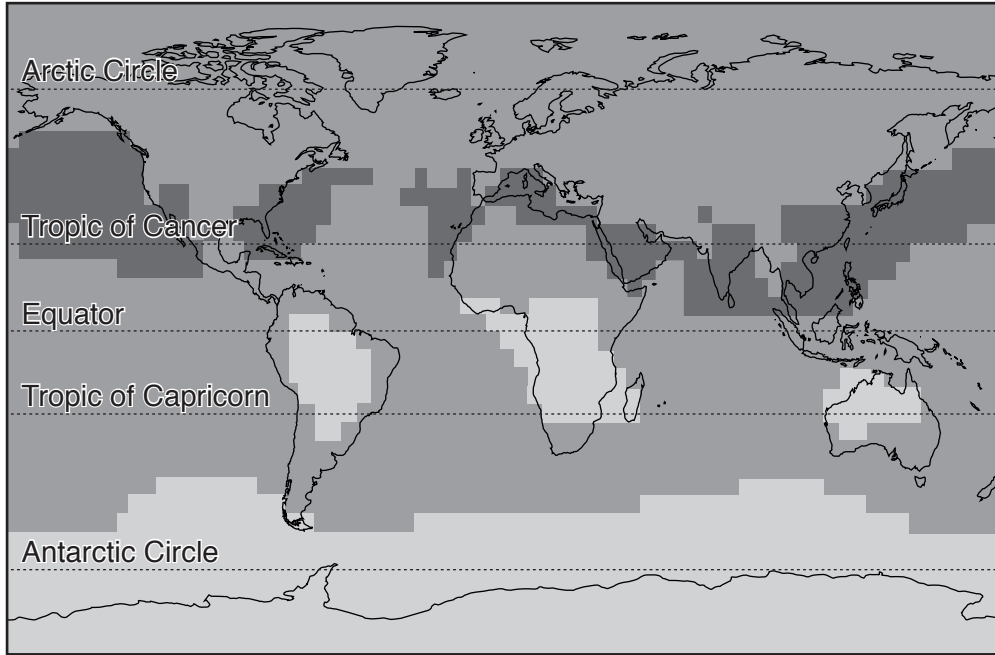
[Total: 20]

## Section B

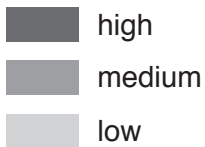
Answer **one** question from this section.

Write your answers on the separate answer paper provided.

- 3 Fig. 3.1 shows concentrations of ground-level ozone from man-made (anthropogenic) sources.

**Key**

ground-level ozone



**Fig. 3.1**

- (a) Describe the global distribution of ground-level ozone shown in Fig. 3.1. Suggest reasons for the pattern. [10]
- (b) 'Management of atmospheric pollution is an international problem which can only be solved by international agreement.' How far do you agree with this statement? [30]

[Total: 40]



4 Table 4.1 provides information on the characteristics of two contrasting types of volcanic eruption.

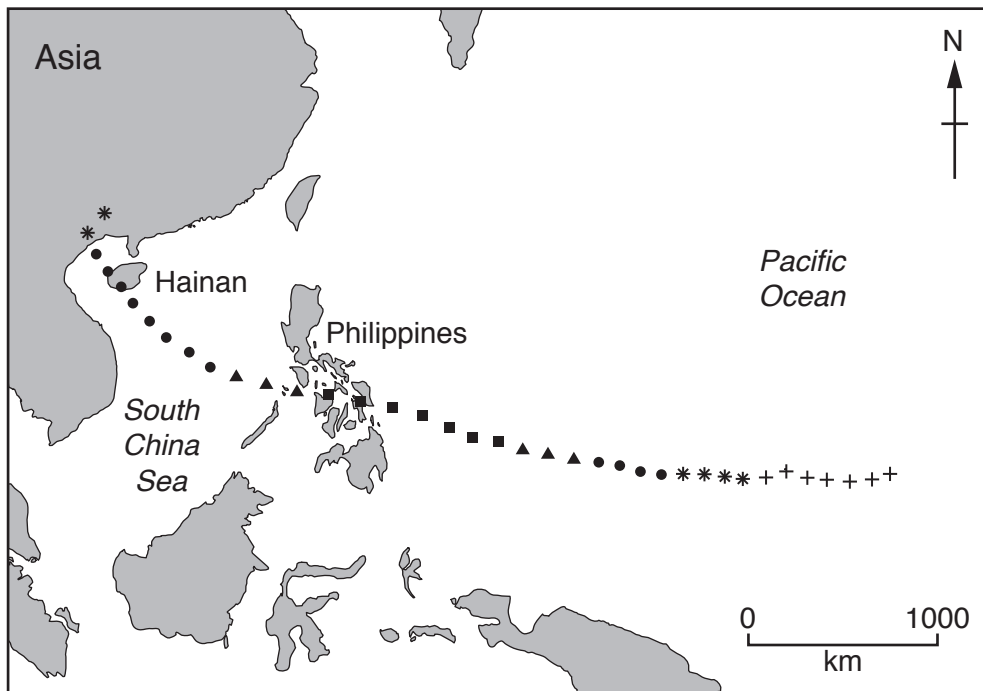
**Table 4.1**

	eruption type <b>A</b>	eruption type <b>B</b>
cone shape	steep sided	shallow sided
location	close to a destructive plate boundary	close to a constructive plate boundary
origin of magma	melted oceanic crust	within the mantle
viscosity of lava	less fluid	more fluid
lava type	acidic	basaltic

- (a) With reference to the information in Table 4.1, suggest which type of eruption might be the most hazardous to humans. Give reasons for your answer. [10]
- (b) Evaluate the strategies used to monitor and analyse volcanic hazards in different areas of the world. [30]

[Total: 40]

- 5 Fig. 5.1 shows the track taken by Typhoon Haiyan in 2013, a tropical cyclone which developed over the Pacific Ocean and travelled westwards. Each point on the image shows the position of Typhoon Haiyan at six hour intervals.



### Key

the symbols indicate the category and the maximum wind speeds

- + tropical depression  
wind speeds of 62 km per hour or less
- \* tropical storm  
wind speeds of 63–118 km per hour
- category 1/2 hurricane  
wind speeds of 119–177 km per hour
- ▲ category 3/4 hurricane  
wind speeds of 178–251 km per hour
- category 5 hurricane  
wind speeds of 252 km per hour or greater

**Fig. 5.1**

- (a) With reference to Fig. 5.1, describe and briefly explain the changing nature of the hazard posed by Typhoon Haiyan as it approached East Asia in 2013. [10]
- (b) With reference to examples of low pressure systems (temperate frontal depressions and tropical cyclones), assess the importance of accurate forecasting in managing the effects of extreme weather events. [30]

[Total: 40]



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