



Answer **all** the questions.

1 Seismic activity is common around Japan.

(a) (i) Define the term *focus*.

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

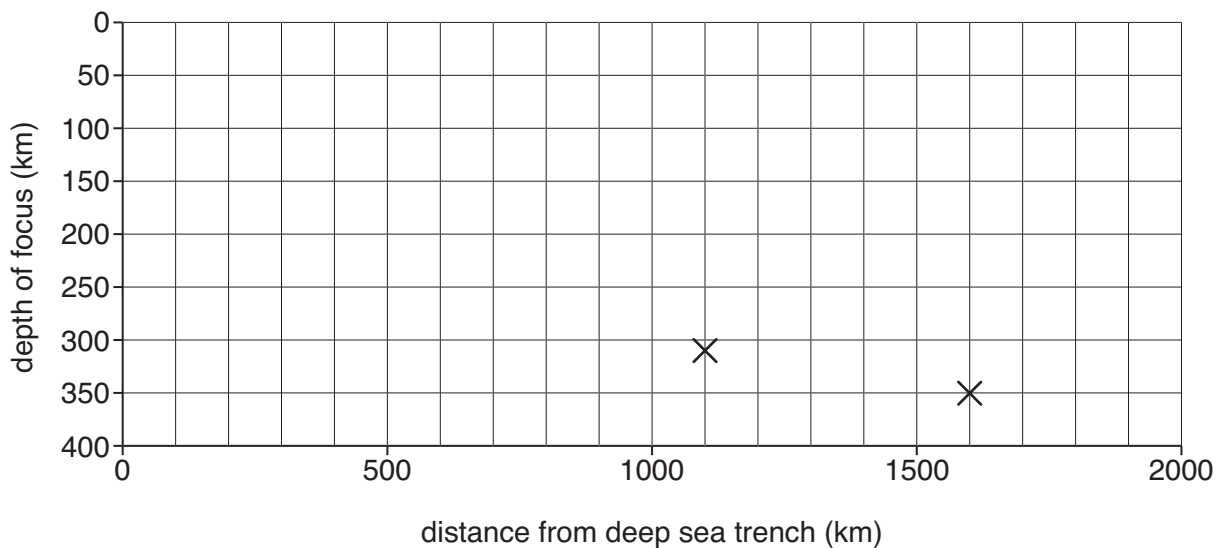
(ii) Describe a deep sea trench.

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

(b) The table below shows data on the depth of focus and distance from the deep sea trench near Japan.

distance from trench (km)	1600	1100	900	390	180	100	420	1200	1000	260
depth of focus (km)	350	310	200	30	35	20	175	375	375	45

(i) Plot the data on the graph below and draw the straight line of best fit. Data from the first two columns have been plotted for you.



[3]

(ii) What is the name of this zone of earthquake foci?



*In your answer, you should use the appropriate technical terms, spelled correctly.*

..... [1]

(iii) Explain what causes this zone.

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

(c) (i) Describe **two** geological hazards caused by shallow focus earthquakes in the Japan region.

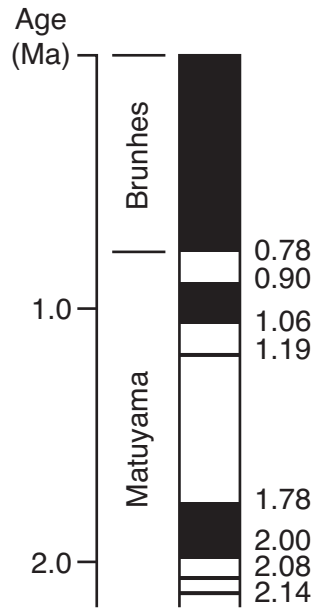
hazard 1 .....  
.....  
hazard 2 .....  
..... [2]

(ii) Name and describe **two** methods of reducing the impact of a major earthquake on the built environment.

method 1 .....  
.....  
.....  
method 2 .....  
.....  
..... [4]

[Total: 14]

- 2 (a) The diagram below shows periods of normal and reversed polarity of the Earth's magnetic field.



- (i) Explain what may cause magnetic field reversals to take place.

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

- (ii) Explain how some rocks retain magnetism permanently.

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

- (b) Using the data from the diagram above calculate the average period of time between the 10 reversals from 2.14 to 0.78 Ma. Give your answer to 3 dp. Show your working in the space below.

..... Ma  
 [2]

(c) Explain how magnetic reversals can provide evidence for sea floor spreading.

.....

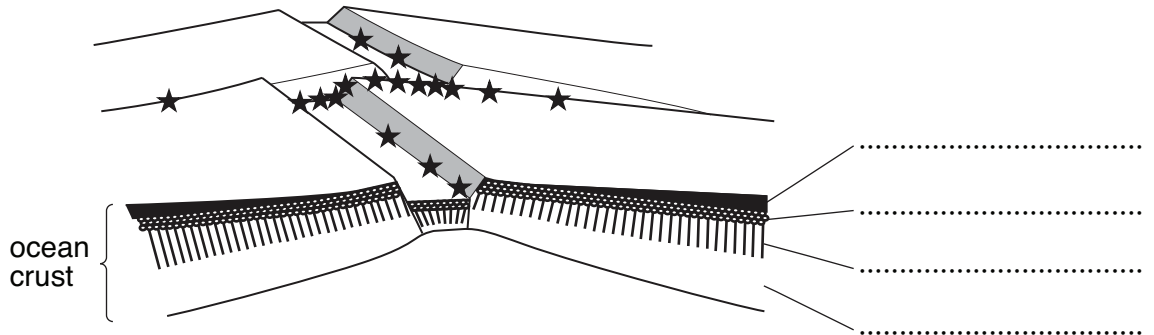
.....

.....

..... [2]

(d)

★ — epicentres



(i) On the block diagram above label:

- a transform fault
- a rift valley/graben

[2]

(ii) Draw and label **two** positive and **one** negative magnetic reversals on the diagram.

[1]

(iii) Explain **two** causes of the earthquakes shown by the epicentres on the diagram.

1 .....

.....

2 .....

..... [2]

(e) (i) Ocean crust consists of basalt, sediment, gabbro and dolerite. Label each of these in the correct order on the diagram. [2]

(ii) Describe how the sediment forms.

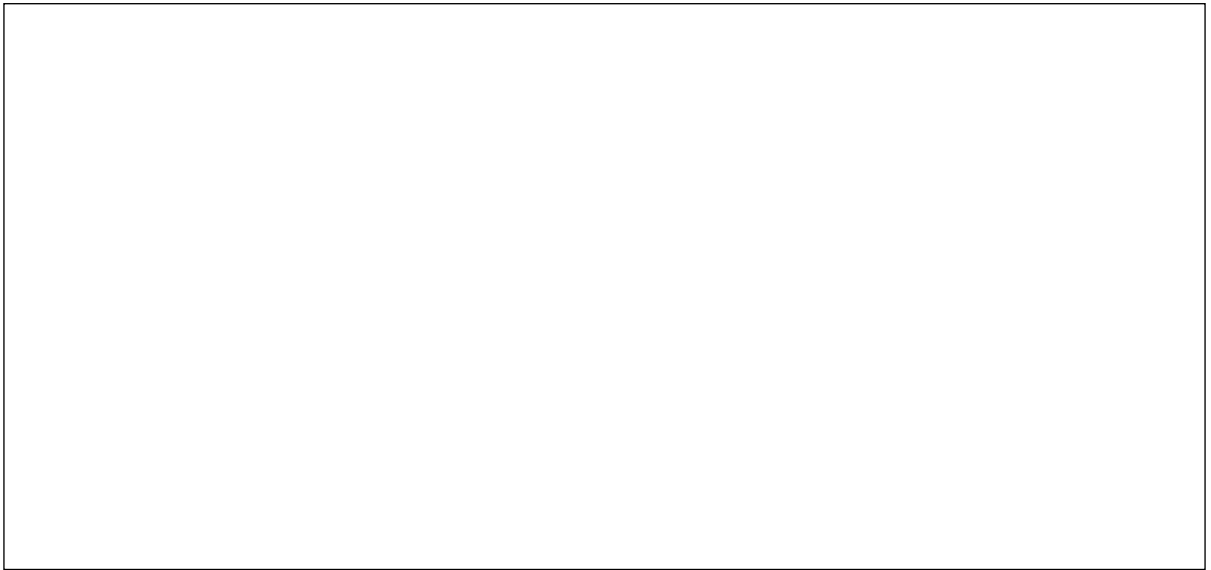
.....

..... [1]

[Total: 16]

3 (a) Draw an asymmetric syncline with at least one bed.

- Label on your cross-section the position of the youngest rocks.
- Draw and label the fold axial plane on the diagram.



[4]

(b) Name a type of fault formed by compressive stress.

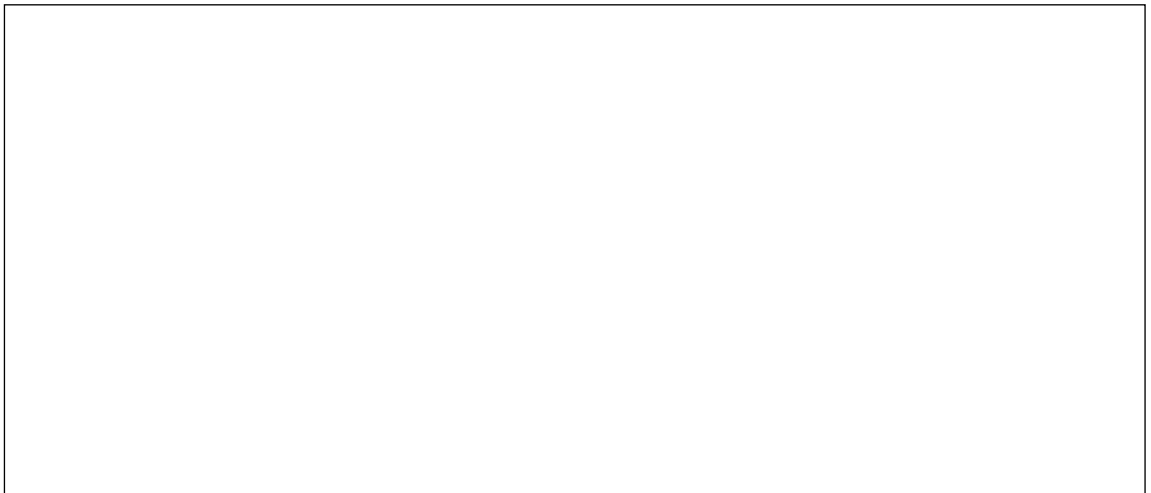
..... [1]

- (c) (i) Cleavage can occur in shales during folding. With the aid of diagrams show how cleavage forms in shales.



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

- (ii) Explain why sandstone does not show cleavage while shale does. Use the words *competent* and *incompetent* in your answer. You may use diagrams to illustrate your answer.

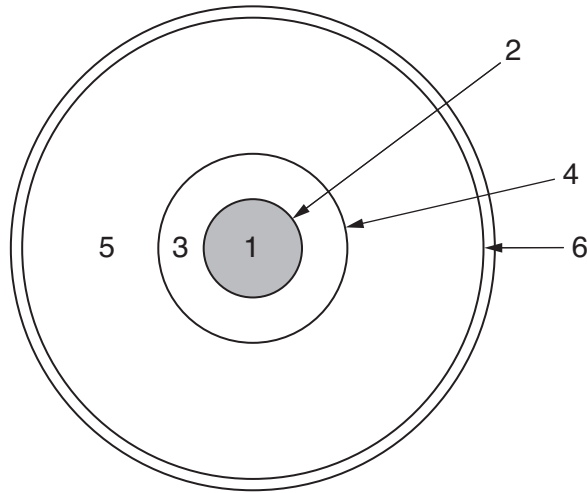


.....  
.....  
.....  
..... [2]

[Total: 10]

Turn over

- 4 The diagram below shows a simplified cross section through the Earth. **1, 3 and 5** are layers. **2, 4 and 6** are discontinuities.



(Not to scale)

- (a) Complete the table by writing the correct number from the diagram in each of the spaces.

layer or discontinuity	number
Gutenberg	
inner core	
Lehmann	
mantle	
Moho	
outer core	

[4]

- (b) Seismic waves are used to study the interior of the Earth.

- (i) Name the instrument used to detect seismic waves.



*In your answer, you should use the appropriate technical terms, spelled correctly.*

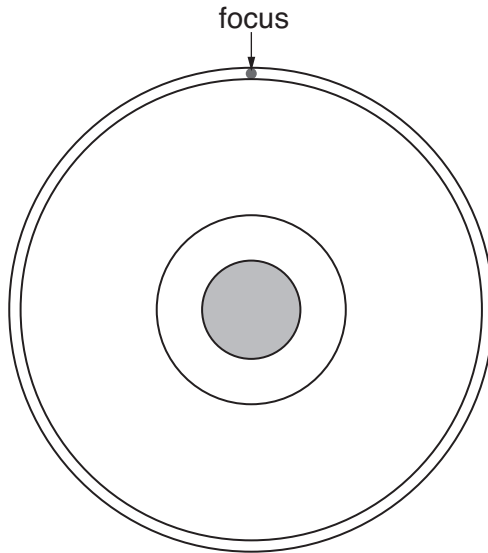
..... [1]



(ii) On the diagram below (not to scale) draw and label:

- the path of a P wave which travels through the core
- the path of an S wave
- the path of an L wave.

[3]



(c) (i) State where the P wave shadow zone is.

From ..... degrees to .....degrees. [1]

(ii) Explain why the P wave shadow zone exists.

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

(iii) Explain why the S wave shadow zone exists.

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

[Total: 12]





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