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Sample assessment 2020

Multiple choice question book

# Earth & Environmental Science

Paper 1



Queensland  
Government



Queensland Curriculum  
& Assessment Authority

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## Section 1

### Instructions

- Answer all questions in the question and response book.
  - This book will not be marked.
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### QUESTION 1

What type of volcano commonly occurs at a convergent plate boundary?

- (A) lava dome
- (B) composite
- (C) fissure
- (D) shield

### QUESTION 2

A major sustainable component of seaweed fertiliser is brown algae. This is because depletion of this resource

- (A) is less than the rate of replenishment.
- (B) is greater than the rate of replenishment.
- (C) is less than the annual yield of the resource.
- (D) is greater than the supply of the natural resource.

### QUESTION 3

During the last decade, a dingo control program was implemented in the Granite Belt region to reduce loss of lambs. This resulted in an increase in the population of wallabies and feral cats, and a decrease in the population of rat species. The program also resulted in a loss of native plant species. With this decrease in plant species, the population of herbivore species decreased. A decision was made to stop the control program and erect dingo fencing around native parks to allow numbers to recover.

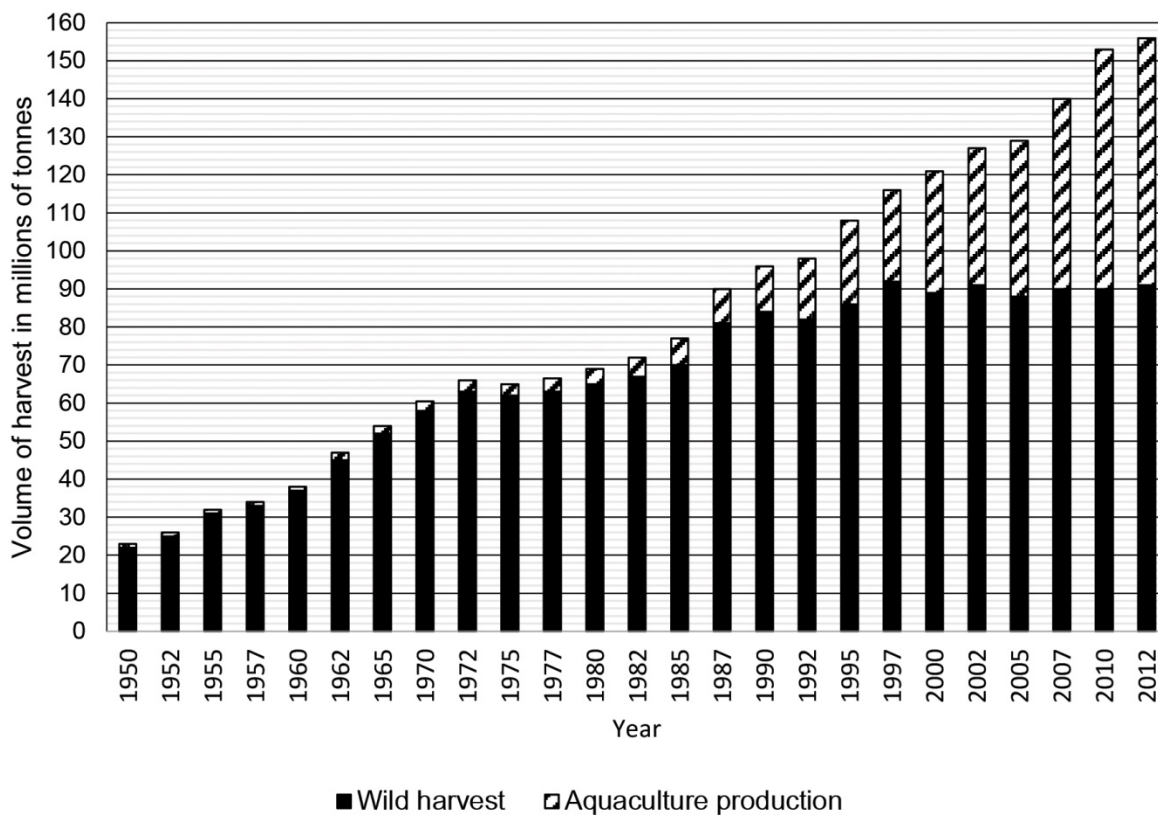
Which of the following scenarios presents the most likely consequences of stopping the dingo control program?

- (A) dingo population increased, wallaby population decreased, flora unaffected
- (B) dingo population decreased, wallaby population decreased, flora unaffected
- (C) dingo population increased, wallaby population unaffected, flora unaffected
- (D) wallaby population decreased, flora increased, insects and bird populations increased

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## QUESTION 4

The graph below shows the harvest volume from world fisheries and aquaculture production.



Which of the following options best represents the average annual increase in aquaculture production from 1970 to 2012?

- (A) 2.2 million tonnes
- (B) 1.5 million tonnes
- (C) 1.3 million tonnes
- (D) 0.8 million tonnes

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## QUESTION 5

Which of the following options lists primary greenhouse gases that are produced both naturally and through anthropogenic activities?

- (A) carbon dioxide, methane, hydrofluorocarbons, chlorofluorocarbons
- (B) water vapour, ozone, carbon monoxide, chlorofluorocarbons
- (C) ozone, hydrofluorocarbons, nitrous oxide, carbon monoxide
- (D) water vapour, methane, carbon dioxide, nitrous oxide

## QUESTION 6

The froth flotation process involves

- (A) creating bubbles to which wanted material adheres.
- (B) adding surfactants to achieve a hydrophilic surface charge.
- (C) aerating the slurry to create a froth that contains unwanted material.
- (D) adding a slurry of fine powder and water to allow clay particles to be separated.

## QUESTION 7

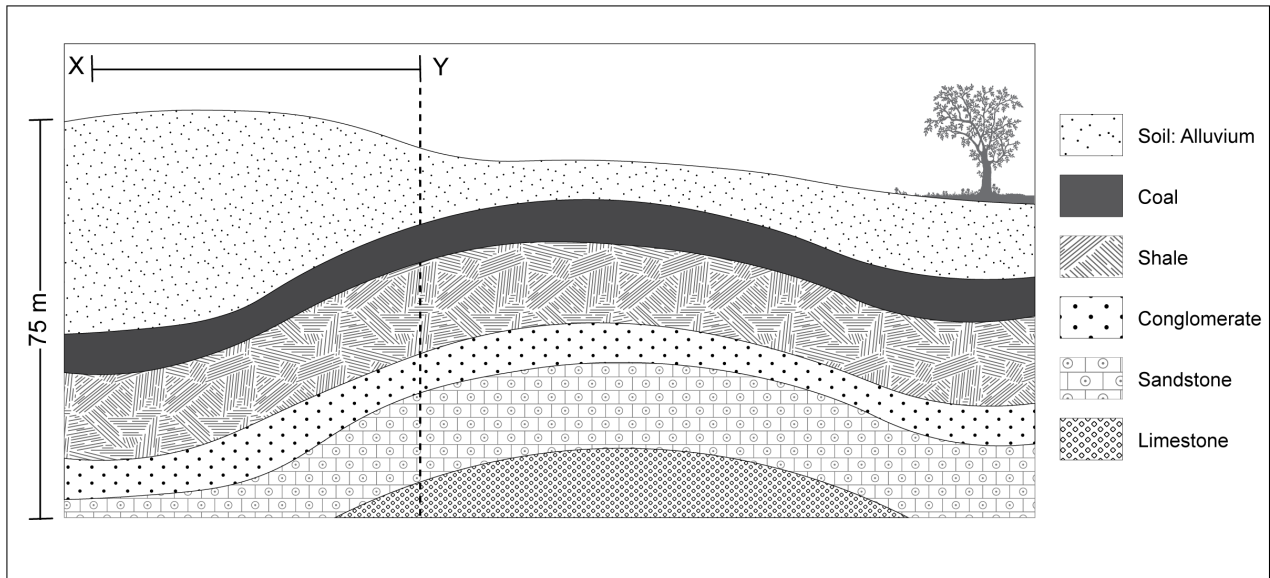
A consequence of climate change that will affect ocean circulation will be evidenced by

- (A) increased upwelling of warm water to the surface of the ocean.
- (B) increased exchange of salt and heat between deep and upper layers of the ocean.
- (C) reduced amounts of carbon dioxide being released from the ocean into the atmosphere.
- (D) reduced movement of warm water away from the equator and cool water to the equator.

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## QUESTION 8

The following diagram represents a cross-section from an area explored for coal.



Which of the following extraction processes would be used to remove coal in the area between points X and Y on the diagram?

- (A) fracking
- (B) onshore drilling
- (C) open-cut mining
- (D) underground mining

## QUESTION 9

Which of the following statements is correct?

- (A) Metallic resources are an example of a non-renewable resource.
- (B) Metallic and energy resources are always found in sedimentary rocks.
- (C) Metallic, non-metallic and energy resources are sourced and extracted from minerals.
- (D) Metallic resources, non-metallic resources and energy resources are malleable and ductile.

## QUESTION 10

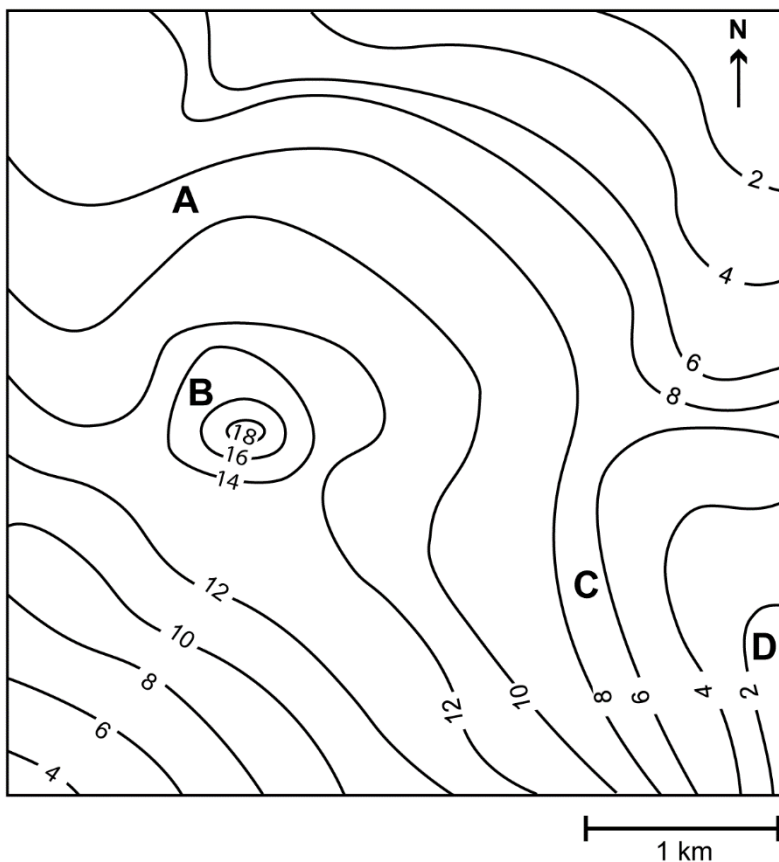
Which of the following geological locations would be most likely to contain a coal deposit?

- (A) a domed limestone outcrop
- (B) the outermost band of a contact metamorphic zone
- (C) a sedimentary basin in which strata contain leaf fossils
- (D) a fault-bound stratigraphic trap containing marine fossils

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## QUESTION 11

The contour map below shows the distribution of mineral sands. The contours represent the percentage of oxides in the sand.



The ore deposit is considered viable if the concentration of oxides is at least 10%. The most viable location to mine is

- (A) Location A.
- (B) Location B.
- (C) Location C.
- (D) Location D.

## QUESTION 12

Of the following, which two exploration methods are the most useful to locate a mineral sand deposit?

- (A) seismic and magnetic surveys
- (B) gravitational and seismic surveys
- (C) magnetic and gravitational surveys
- (D) borehole logging and gravitational surveys

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## QUESTION 13

The table below shows an extract from a geochemical exploration dataset showing the concentration of gold in grams per tonne (g/t) for four drillhole samples.

Sample depth (m)	U34	U33	U31	U28
1	3.9	5.7	6.5	0.89
2	3.4	3.3	9.1	0.15
3	4.1	11	5.5	1.13
4	1.1	4.4	0.5	0.53
5	1.2	0.9	1.3	0.11
6	1.3	0.7	10	0.07
7	0.9	52	1.8	0.63
8	1	13	7.6	0.62
9	0.7	50	13	1.52
10	5.2	110	970	0.38
11	9.2	545	201	1.98
12	4.8	150	115	0.78
13	12	300	159	5
14	42	221	145	2.6

Assuming it is economically viable to mine for gold at Au > 10 g/t, which drillholes are more viable using an open-cut process?

- (A) U28 and U33
- (B) U31 and U33
- (C) U31 and U34
- (D) U33 and U34

## QUESTION 14

Which is the most important process for ensuring sustainable ground water use in a regional catchment area?

- (A) to maintain water usage at levels below annual net recharge volumes
- (B) to minimise effect of water salinity on river ecosystems
- (C) to meet environmental demands of the catchment area
- (D) to meet demands of urban development



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## QUESTION 15

A scientific agency conducted a study to evaluate the efficiency of wind and hydroelectric renewable energy sources at different locations.

Energy	Name plate capacity (MW)	Average annual production (MW·h)
Hydro at location X	209.3	875 000
Wind at location X	2080	4 200 000
Hydro at location Y	189.4	905 000
Wind at location Y	1980	4 050 000

Compare the efficiency of wind and hydroelectric renewable energy sources in the table above to determine the most efficient renewable energy system.

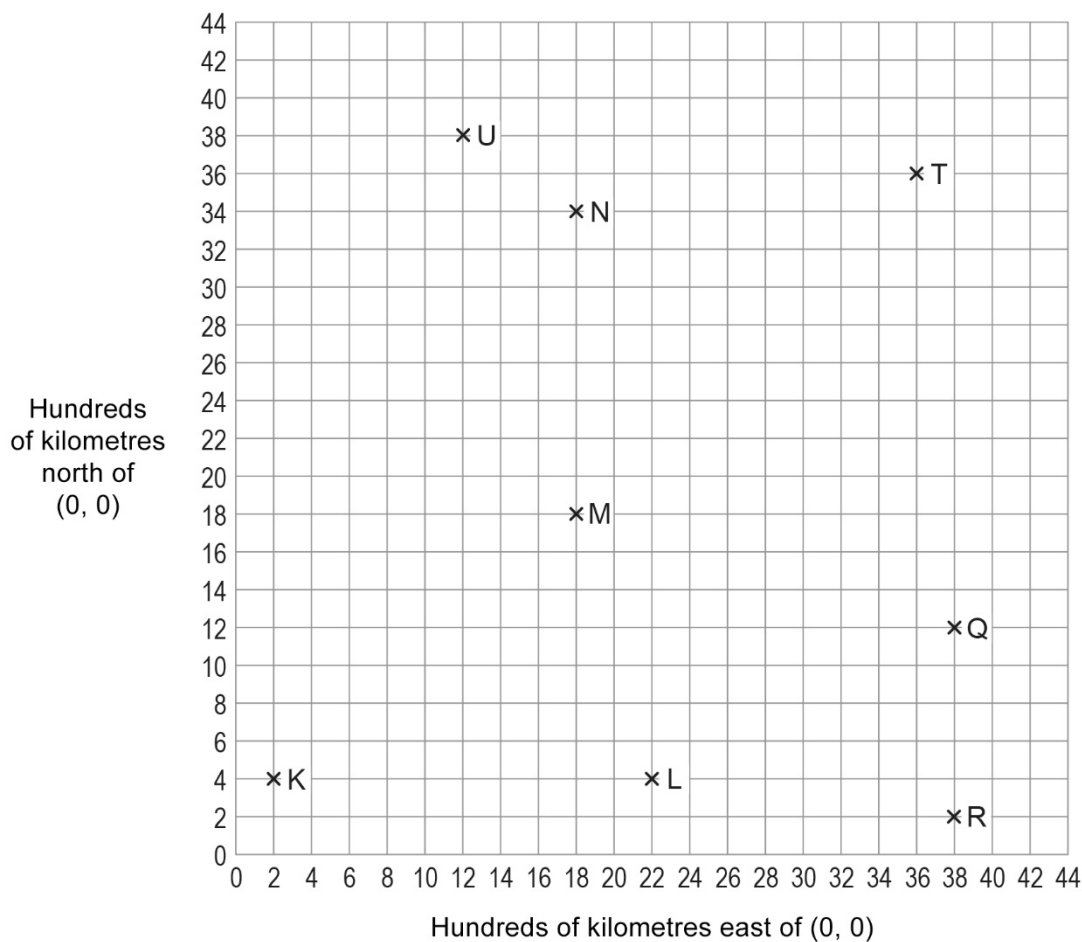
- (A) hydro at location X
- (B) wind at location X
- (C) hydro at location Y
- (D) wind at location Y

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## QUESTIONS 16 & 17

P-waves and S-waves travel through the Earth at different speeds. When the time between the arrival of P-waves and S-waves is one minute, the epicentre is about 800 km away.

The figure below is a flat grid representing an area on the surface of the Earth.



### QUESTION 16

An earthquake is recorded by a seismometer at M. The time difference between the arrival of the corresponding P-waves and S-waves at M is two minutes.

Of the locations marked on the grid above, which is the most likely location of the epicentre?

- (A) K
- (B) L
- (C) N
- (D) T

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## QUESTION 17

If the epicentre of a different earthquake is determined to be 3000 km from N, 2400 km from T and 1800 km from L, which of the following points would best represent the epicentre's location?

- (A) M
- (B) Q
- (C) R
- (D) U

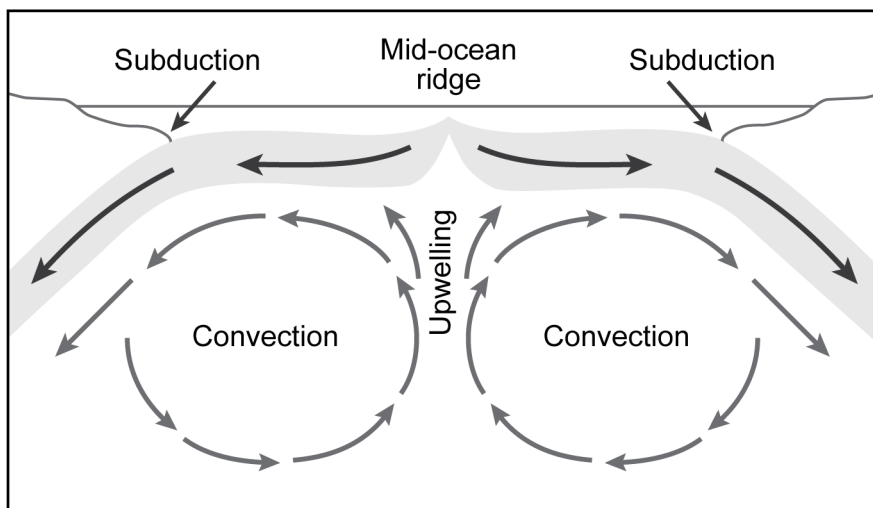
## QUESTION 18

Tsunamis can result from

- (A) large volumes of water being displaced.
- (B) an oceanic plate colliding into a continental plate.
- (C) violent seafloor movement associated with earthquakes.
- (D) an explosive volcanic eruption causing an earthquake in a continental plate.

## QUESTION 19

Which two types of plate boundary can be seen in the figure below?



- (A) divergent and transform
- (B) divergent and convergent
- (C) descending and divergent
- (D) transform and convergent

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## QUESTION 20

Ecosystem services can be divided into groups based on their function. Which of the following groups of functions best describes supporting services in an ecosystem?

- (A) aesthetic, cultural, educational and recreational
- (B) disease regulation, climate regulation and carbon sequestration
- (C) aesthetic, nutrient and water cycling, provisioning of food and water
- (D) nutrient and water cycling, soil formation, air and water purification

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## References

### Question 8

Figure from Tony Shellshear of GDD (Geological Data Design).

### Question 19

Figure derived from University of Illinois 2019, 'A shift to plate tectonics',  
<http://publish.illinois.edu/platetectonics/a-shift-to-plate-tectonics>.

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