Government of South Australia

SACE Board of SA

External Examination 2011

# 2011 GEOGRAPHY

**ATTACH SACE REGISTRATION NUMBER LABEL TO THIS BOX**

**Monday 7 November: 9 a.m.**

Time: 2 hours

Pages: 19
Questions: 24

## Core Topic: Population, Resources, and Development

Examination material: one 19-page question booklet
one two-sided sheet of additional material
one SACE registration number label

*Approved dictionaries and calculators may be used.*

**Instructions to Students**

1. You will have 10 minutes to read the paper. You must not write in your question booklet or use a calculator during this reading time but you may make notes on the scribbling paper provided.

2. This paper consists of twenty-four short-answer and extended-answer questions.
   Answer ***all*** questions in the spaces provided in this booklet.
   Remove the tear-out sheet on pages 7 and 8. Refer to page 7 when answering Questions 8 and 9 on page 9. Refer to page 8 when answering Questions 11 to 14 on pages 11 and 12.

3. The total mark is 60.

4. Attach your SACE registration number label to the box at the top of this page.

**STUDENT'S DECLARATION ON THE USE OF CALCULATORS**

By signing the examination attendance roll I declare that:

- my calculators have been cleared of all memory
- no external storage media are in use on these calculators.

I understand that if I do not comply with the above conditions for the use of calculators I will:

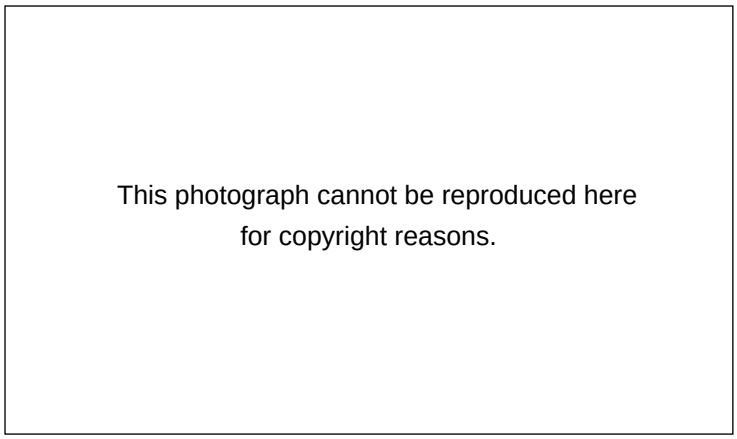
- be in breach of the rules
- have my results for the examination cancelled or amended
- be liable to such further penalty, whether by exclusion from future examinations or otherwise, as the SACE Board of South Australia determines.

*Answer **all** the questions. Write your answers in the spaces provided after each question.*

*Refer to the topographic map ROBERTSON, scale 1:50 000, on Side 1 of the separate sheet of additional material, where appropriate, when answering Questions 1 to 9.*

1. *Refer to the following photograph and to the topographic map. The direction in which the photograph was taken is shown with an arrow on the topographic map within map coordinate Q9:*

**Breërivier Valley**



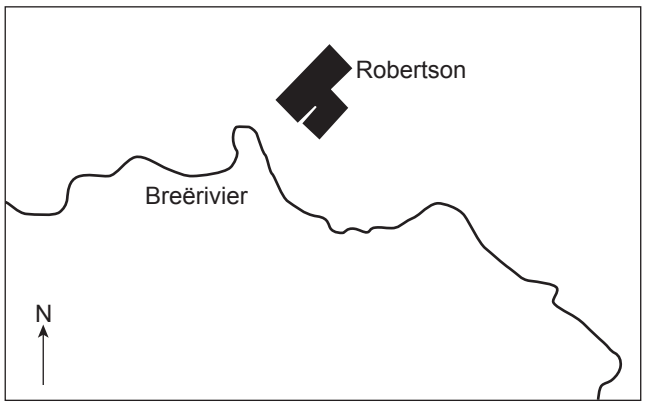

*Source*: SA Explorer website, www.saexplorer.co.za

State the name of the feature in the distant background of the photograph as it is labelled on the topographic map.

_____ (1 mark)

2. *Refer to the following diagram and to the topographic map:*

**The course of the Breërivier in the vicinity of Robertson**




On the diagram above, draw an arrow along the course of the Breërivier to show its direction of flow.

(1 mark)

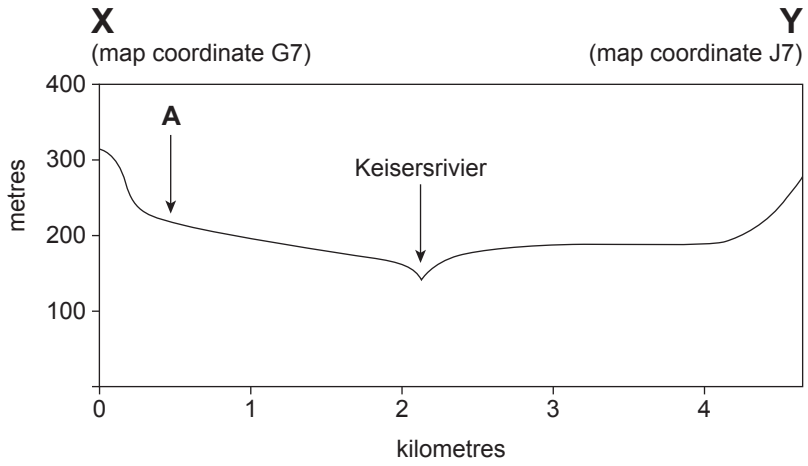
3. Without giving any calculations, compare the gradients of the road and the railway that run between **R** (map coordinate C3) and **S** (map coordinate G4) on the topographic map.

_____

_____

_____ (1 mark)

4. *Refer to the following cross-section diagram and to the topographic map:*




(a) State the vertical exaggeration of the cross-section diagram above.

_____ (1 mark)

(b) Name the feature at the location labelled **A** on the cross-section diagram above.

_____ (1 mark)

(c) On the cross-section diagram above, mark and label the exact location of the road that leads from Robertson to Mistica (map coordinate H8).

(1 mark)

(d) Which *one* of the following terms describes the shape of the slope that extends from **X** to Keisersrivier? Tick the appropriate box.

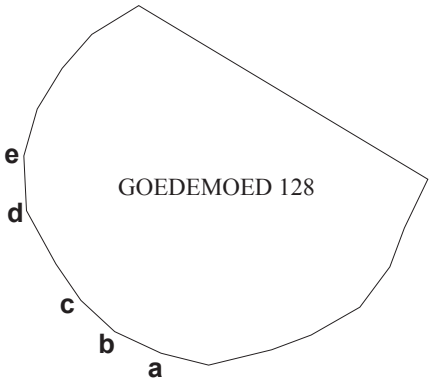
Concave ☐ Convex ☐ Convex–concave ☐ Uniform ☐ (1 mark)

5. The distance covered by every one degree of longitude across the topographic map can be estimated using information given at the edge of the map. This distance is closest to which *one* of the following values? Tick the appropriate box.

22.5 km ☐ 45 km ☐ 90 km ☐ 180 km ☐ (1 mark)

6. *Refer to the following diagram and to Side 1 of the separate sheet:*

**Section Goedemoed 128**
**(map coordinate M6 on the topographic map)**




(a) Survey boundaries are determined by taking bearings along a transect, starting from a known point; for example, point **a** for Section Goedemoed 128. Points **a**, **b**, **c**, **d**, and **e** are shown on the diagram above and on the topographic map.

Which *one* of the following parts of the boundary of Section Goedemoed 128 is aligned most closely with magnetic north? Tick the appropriate box.

**a–b** ☐ **b–c** ☐ **c–d** ☐ **d–e** ☐ (1 mark)

(b) The area of Section Goedemoed 128 is closest to which *one* of the following values? Tick the appropriate box.

5 sq. km ☐ 10 sq. km ☐ 20 sq. km ☐ 40 sq. km ☐ (1 mark)

(c) Use map evidence to identify *two* features on the map, other than Breërivier, that together allow irrigation to occur within Section Goedemoed 128.

_____

_____

_____ (1 mark)

(d) Which type of vegetation within Section Goedemoed 128 is *least* likely to have been planted by people?

_____

_____ (1 mark)

7. Paper maps, such as the one printed on Side 1 of the separate sheet, and digital maps have different advantages for studying different issues, for example, the water supply of an area. Expand on this statement, referring to *one* advantage of each type of map for studying a particular issue.

_____

_____

_____

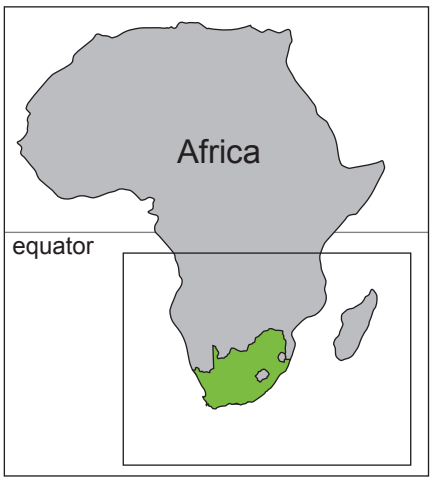
_____

_____

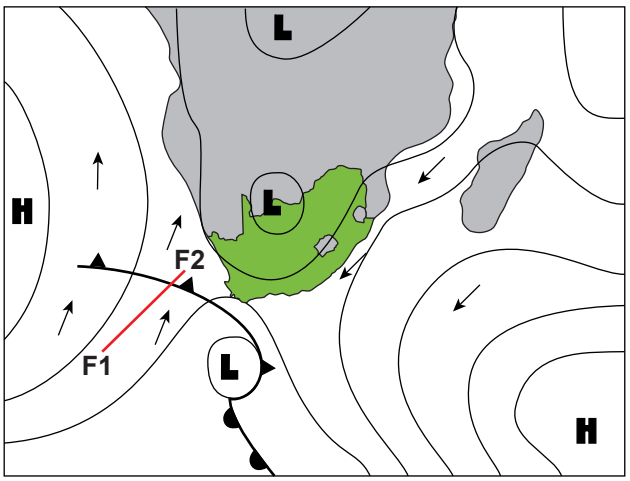
_____ (2 marks)

*Refer to the information on the tear-out sheet (page 7) and to the maps below, where appropriate, when answering Questions 8 and 9 on page 9.*

**Location of weather map**




**Typical weather systems for southern Africa**




**Key**

cold front

warm front

wind direction

isobar

H high-pressure cell

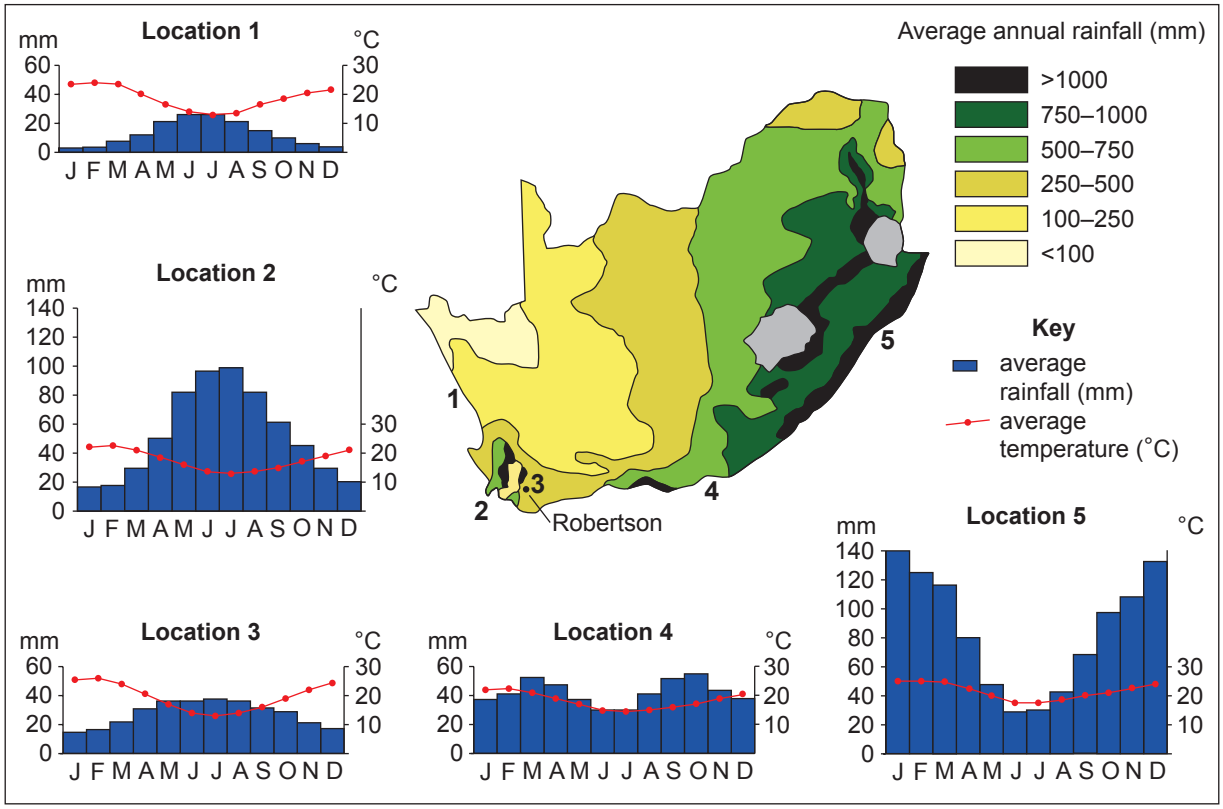
L low-pressure cell

*Source:* Typical weather systems for southern Africa based on Figure 1(c) in M. Rouault, C.J.C. Reason, & J.R.E. Lutjeharms, 'Influence of Agulhas Current High Latent Heat Flux on South African Weather', poster presentation at the Working Group on Air–Sea Fluxes, 2001

*Remove this page from the question booklet by tearing along the perforations.*

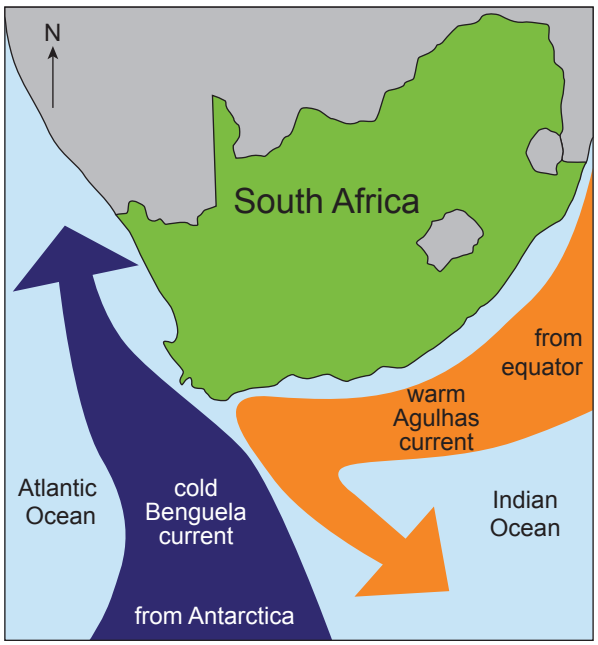
*Refer to the information below, where appropriate, when answering Questions 8 and 9 on page 9. The regions in grey are not part of South Africa.*

**Figure 1: Average annual rainfall for South Africa and climate graphs for selected locations**




*Source*: Rainfall map adapted from South Aftrican Tourism, www.south-africa-toursandtravel.com; climate graphs: rainfall data from South Africa Rain Atlas, and temperature data from World Weather Online

**Figure 2: Ocean currents influencing South Africa**




*Source*: Adapted from archived article, 'Cape Point and the Waters of False Bay', Simon's Town website, www.simonstown.com

*Refer to the information below, where appropriate, when answering Questions 11 to 14 on pages 11 and 12:*

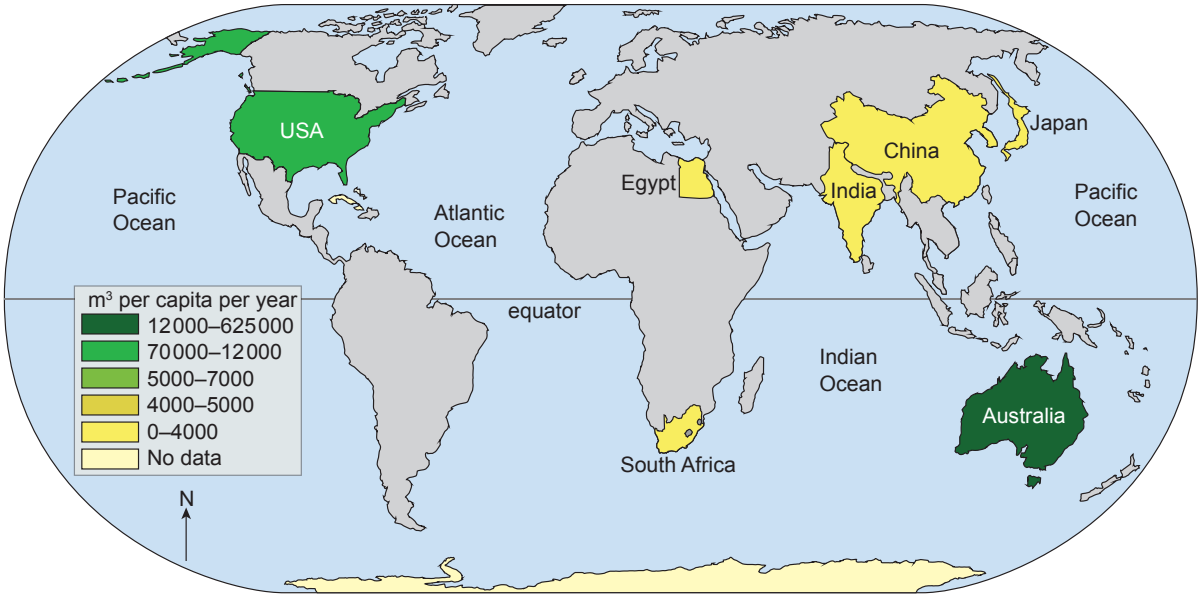
The water footprint of a country is defined as the volume of water needed for the production of the goods and services consumed by the inhabitants of the country, measured in cubic metres per capita per year.

**Water footprint and water availability for selected countries**

| *Country* | *Total water footprint (1997–2001) ($m^3$/capita/year)* | *Water footprint by consumption category (1997–2001) ($m^3$/capita/year)* | | | *Water availability (2007) ($m^3$/capita/year)* |
|---|---|---|---|---|---|
| | | *Domestic water* | *Agricultural products* | *Industrial production* | |
| Australia | 1 393 | 341 | 777 | 275 | 23 348 |
| China | 702 | 26 | 605 | 71 | 2 134 |
| Egypt | 1 097 | 66 | 919 | 111 | 22 |
| India | 980 | 38 | 921 | 21 | 1 134 |
| Japan | 1 153 | 136 | 779 | 237 | 3 365 |
| South Africa | 931 | 57 | 813 | 59 | 928 |
| United States of America | 2 483 | 217 | 1459 | 806 | 9 344 |
| **Global average** | **1 243** | **57** | **1 067** | **119** | **6 616** |

*Source:* A.Y. Hoekstra & A.K. Chapagain, 'Water footprints of nations: Water use by people as a function of their consumption pattern', *Water Resources Management*, 2007, vol. 21, issue 1, p. 42;
The World Bank, data.worldbank.org, accessed 5 August 2011

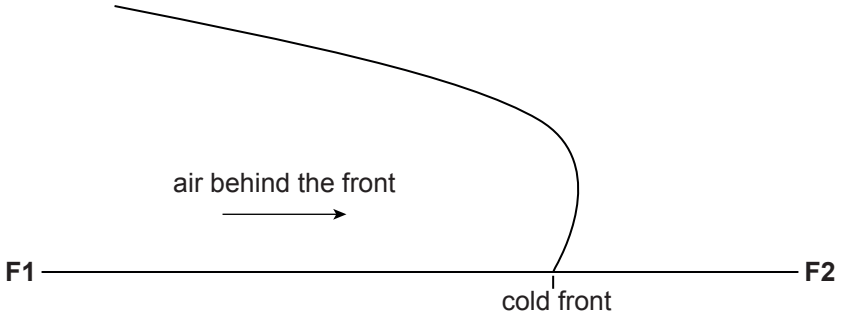
**Water availability for selected countries 2007**




*Source*: Based on data from The World Bank, data.worldbank.org, accessed 5 August 2011

8. (a) *Refer to the following diagram, which shows a cross-section* **F1**–**F2** *of the cold front shown on the weather map on page 6.*

Add information to the diagram below to show the processes that lead to frontal rainfall.




(1 mark)

(b) Name *one* cause of rainfall, other than the passage of cold fronts, that occurs within the water cycle.

_____ (1 mark)

(c) Based on the information provided, explain how ocean currents contribute to the difference in the average annual rainfall at location **1** and location **5** on the coast of South Africa.

_____

_____ (1 mark)

9. (a) Compare the seasonality of rainfall at locations **2** and **4**.

_____

_____

_____ (1 mark)

(b) *Refer to the topographic map and to Figure 1 on the tear-out sheet (page 7).*

Use evidence from the topographic map to explain the influence of seasonal rainfall in the Robertson area on *one* aspect of the natural environment.

_____

_____

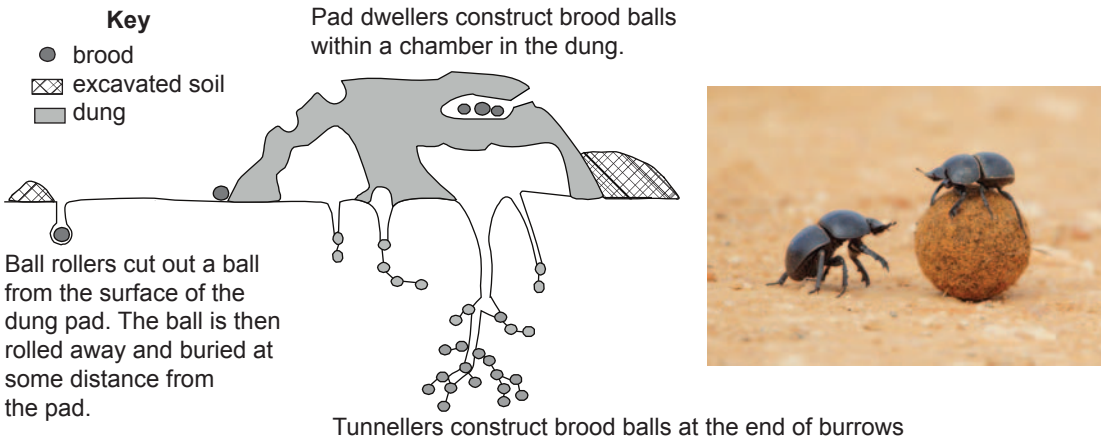
_____ (1 mark)

***No further questions refer to Side 1 of the separate sheet of additional material.***

10. *Refer to the following information when answering questions (a) and (b) below:*

**DUNG BEETLES**

- There are thousands of species of dung beetles worldwide. They feed on dung mainly from large plant-eating animals such as elephants, zebras, and cows.
- Dung beetle species are divided into three types: pad dwellers, ball rollers, and tunnellers.
- Dung beetles lay broods of eggs in balls made of dung so that the larvae have a food source when they hatch.
- Dung beetles and their larvae are eaten by other animals such as mice, snakes, and meerkats.




*Source:* Adapted from B. Doube & G. Dalton, *Dung Beetles Transform a Pollutant into an Environmental and Agricultural Benefit,* Fleurieu Beef Group Inc, 2003, p. 6; photograph © Cooper 5022, Dreamstime.com

(a) Which *one* of the following phrases describes the roles of dung beetles in an ecosystem? Tick the appropriate box.

| | |
|---|---|
| Prey and producer | ☐ |
| Predator and decomposer | ☐ |
| Producer and consumer | ☐ |
| Decomposer and prey | ☐ |

(1 mark)

(b) Explain how dung beetles may benefit the abiotic (non-living) environment of an ecosystem in any *two* distinctly different ways.

(i) _____

_____ (1 mark)

(ii) _____

_____ (1 mark)

*Refer to the table and map on the tear-out sheet (page 8), where appropriate, when answering Questions 11 to 14 below and on page 12.*

11. Which of the following factors determine the water footprint of a country? Tick the appropriate box.

| | |
|---|---|
| 1 = water use efficiency | 3 = climate of the country |
| 2 = average income per capita | 4 = amount of meat consumed per capita |

1 and 3 only. ☐

1, 2, and 4 only. ☐

1 and 2 only. ☐

1, 2, 3, and 4 only. ☐ (1 mark)

12. Suggest *two* reasons why the domestic water footprint of people who live in China differs from that of people who live in Australia.

_____

_____

_____

_____ (2 marks)

13. Using information from the table, suggest *one* way for Australians to reduce their water footprint.

_____

_____

_____

_____ (1 mark)

14. *Refer to the table and map on the tear-out sheet (page 8), where appropriate.*

(a) (i) From the table, identify *one* country with a water footprint that exceeds water availability.

_____ (1 mark)

(ii) How are countries such as the one you have identified in part (a)(i) able to use more water than they have available?

_____

_____ (1 mark)

(b) Suggest *one* reason why the map may not be as useful as the table when analysing water availability.

_____

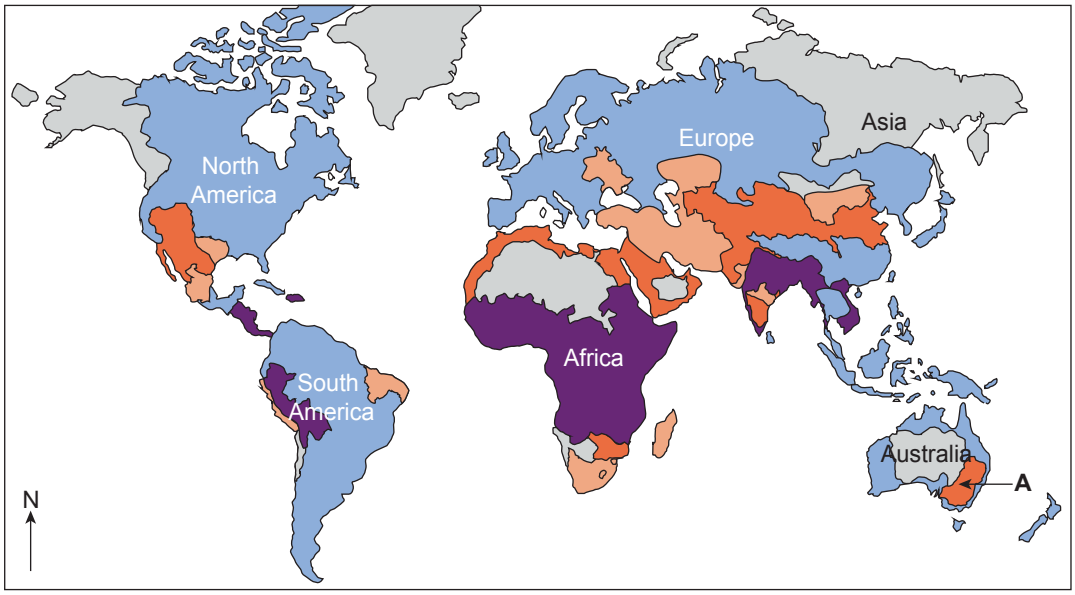
_____

_____ (1 mark)

15. *Refer to the following information and map when answering questions (a) and (b) opposite:*

Physical water scarcity is a relative concept that compares the availability of water to actual use.

**Global Water Scarcity**




**Key**

little or no water scarcity
physical water scarcity
approaching physical water scarcity
economic water scarcity
not estimated

*Source:* Based on Map 2 in D. Molden (Ed.), *Water for food, water for life: a comprehensive assessment of water management in agriculture: summary,* Earthscan, London; International Water Management Institute, Sri Lanka, 2007, p. 11

(a) Give *one* likely reason why there is more water used in area **A** than is available.

_____

_____

_____ (1 mark)

(b) Suggest *one* impact, in each of the following categories, that water scarcity could have on regions experiencing physical water scarcity.

(i) Economic: _____

_____

_____ (1 mark)

(ii) Social: _____

_____

_____ (1 mark)

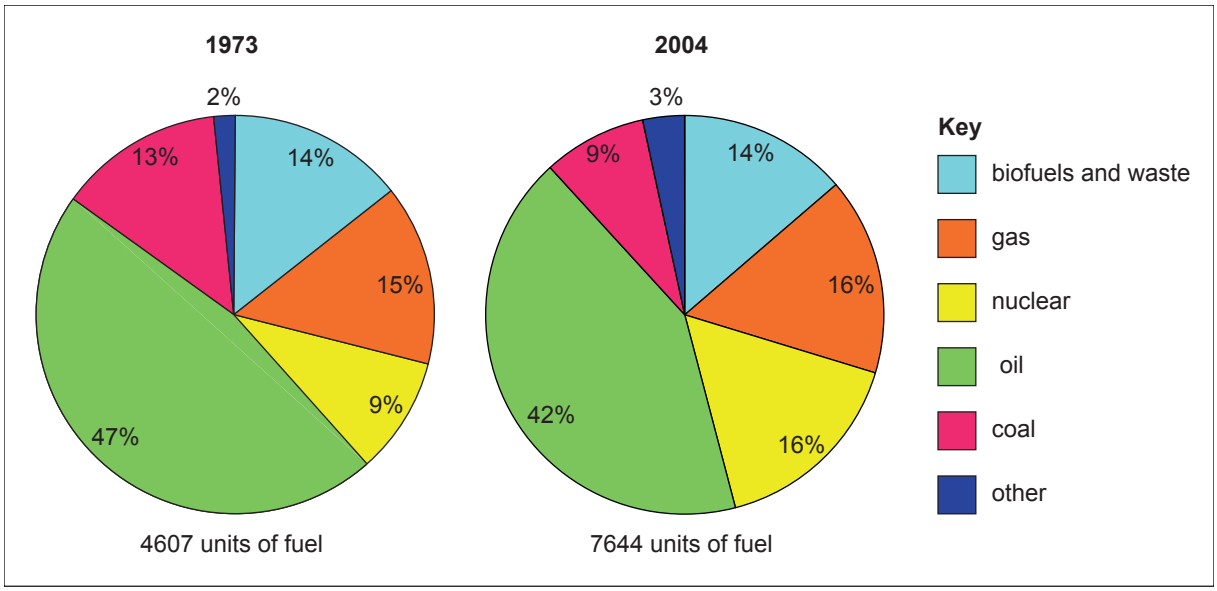
(iii) Environmental: _____

_____

_____ (1 mark)

16. *Refer to the following pie charts:*

**Total World Fuel Consumption**




*Source*: Adapted from International Energy Agency, *Key World Energy Statistics 2006*, OECD/IEA, France, 2006, p. 28

(a) Show your understanding of the terms 'renewable resources' and 'non-renewable resources' using examples from the forms of energy referred to in the pie charts above.

_____

_____

_____

_____ (2 marks)

(b) The growth in total world fuel consumption from 1973 to 2004 was closest to which *one* of the following? Tick the appropriate box.

35% ☐ 65% ☐ 95% ☐ 125% ☐ (1 mark)

(c) Identify *one* source of energy that was being used proportionately less in 1973 than in 2004. Suggest a reason for this.

_____

_____

_____ (1 mark)

17. *Refer to the information on Side 2 of the separate sheet of additional material.*

Many less economically developed countries rely on the waters of the Nile Basin. Using data related to population, environmental, and economic factors for Ethiopia, present an argument supporting Ethiopia's claim for a larger share of Nile waters as proposed in Source 2.

(5 marks)

***No further questions refer to Side 2 of the sheet of additional material.***

18. State *one* term, other than 'drainage basin', that is conventionally used to define the area that provides water to a particular stream.

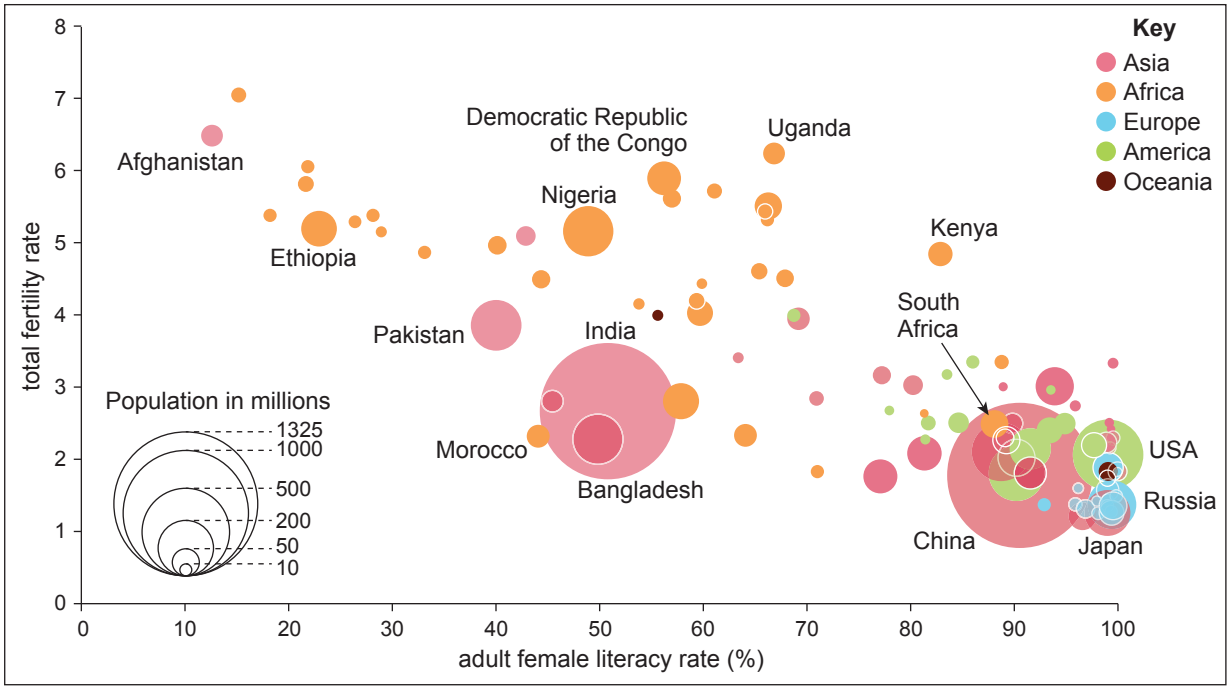
_____

_____

_____ (1 mark)

19. *Refer to the following graph:*

**Correlation between fertility and female education for selected countries**




*Sources:* Adapted from European Environment Agency, 'Correlation between fertility and female education', 13 December 2010, www.eea.europa.eu/data-and-maps/figures

(a) What is the total fertility rate for Kenya?

_____ (1 mark)

(b) What is the relationship between the adult female literacy rate and the total fertility rate?

_____

_____

_____ (1 mark)

20. State *two* factors, other than education, that could account for Kenya's high total fertility rate.

(a) _____

_____ (1 mark)

(b) _____

_____ (1 mark)

21. (a) What is meant by the term 'replacement rate'?

_____

_____

_____ (1 mark)

(b) Suggest *two* reasons why some governments may want to increase the total fertility rate of their country to levels above the replacement rate.

(i) _____

_____ (1 mark)

(ii) _____

_____ (1 mark)

22. With reference to a specific country from your studies, evaluate *one* of the ways in which a government has attempted to change the total fertility rate.

_____

_____

_____

_____

_____ (2 marks)

23. *Refer to the following table when answering questions (a) and (b) below:*

**Selected economic and population statistics for two countries**

| | *Dependents (%)* | *Average life expectancy at birth (years)* | *Aged over 65 years (%)* | *GDP per capita (US$)* |
|---|---|---|---|---|
| Country A | 32.3% | 81.2 | 14.0% | $41 000 |
| Country B | 44.8% | 52.4 | 2.7% | $2 300 |

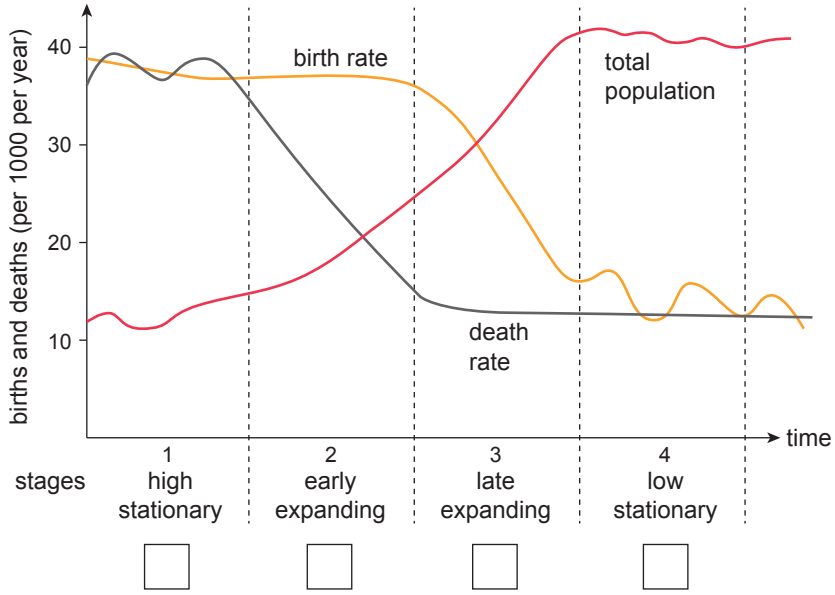
*Source:* CIA World Factbook, www.cia.gov, 23 August 2011

(a) Which country is more developed? Tick the appropriate box.

Country A ☐ Country B ☐ (1 mark)

(b) In the appropriate boxes under the following diagram, write the letters 'A' and 'B' to match Country A and Country B to their stage in the Demographic Transition Model.

**Demographic Transition Model**




*Source*: Adapted from Barcelona Field Studies Centre website, http://geographyfieldwork.com/DemographicTransition.htm, accessed 2 September 2011

(2 marks)

24. Forced migration occurs for different reasons and has various impacts on host countries. Expand on this statement referring to at least *one* example from your studies. Make clear the meaning of the term 'forced migration' in your answer.

(5 marks)

**GEOGRAPHY 2011**

**ACKNOWLEDGMENT**

**Booklet**

The map for Question 15 is reproduced by permission of the copyright owner, International Water Management Institute, from Water for Food, Water for Life: A Comprehensive Assessment of Water Management in Agriculture, London: Earthscan, and Colombo: International Water Management Institute, 2007. The summary document Water for food, water for life can be accessed from http://www.iwmi.cgiar.org/Assessment/.

The pie charts for Question 16 on page 14 are © OECD/IEA 2006.

The graph for Question 23 on page 18 is reprduced under Creative Commons licence Attribution-NoDerivs 3.0 Unported (CC BY-ND 3.0).

**Broadsheet**

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