Write your name here

Surname	Other names

Edexcel
Principal Learning

Centre Number | | | | | |

Candidate Number | | | | |

Environmental and Land-based Studies

Level 3
Unit 7: Sustainable Development of Resources

Friday 15 June 2012 – Morning
Time: 1 hour

Paper Reference
ES307/01

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 50.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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PEARSON

Answer ALL questions. Write your answers in the space provided.

1 Study Figure 1(a) a graph showing the demand and supply of rare-earth metals since 2000, and Figure 1(b) a newspaper article.

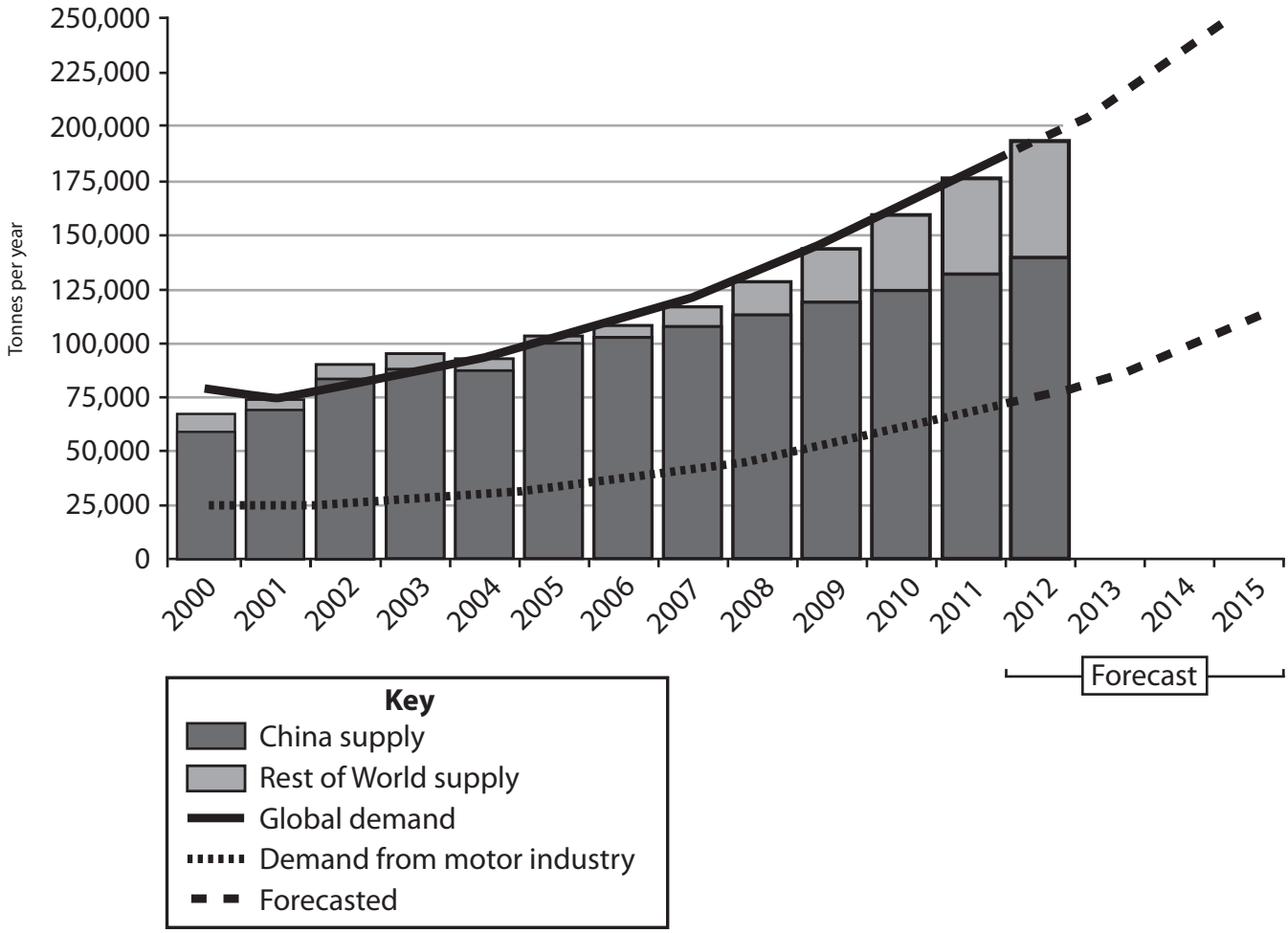

Figure 1(a)

GLOBAL SUPPLY OF RARE-EARTH METALS THREATENED

Rare-earth metals have magnetic and light-emitting properties and have become crucial raw materials for many modern manufacturers. Products using rare-earth metals include lasers, batteries, sunglasses, electric hybrid cars, PC memory, smartphones and guided missile systems. Extracting and purifying the metals is expensive and environmentally risky, due to toxic waste and radio-activity which are issues at mines and processing plants.

Market prices for most rare-earths exploded during 2009–10 as a result of global demand rising rapidly. China has a monopoly in the production of rare-earth metals (Figure 1(a)). Mining is under Chinese government control, and recently they have limited exports. A rare-earth metal shortage is expected until around 2015 when new mines outside China will have had a chance to become operational.

Figure 1(b)

(a) Describe the trends of supply and demand in rare-earth metals shown in Figure 1(a).

(3)

(b) (i) Outline the ethical aspects of rare-earth production for China.

You may use information from Figure 1(a) and 1(b) in your answer.

(4)

(ii) Suggest why rare-earth production has become a global sustainable resource development (SRD) issue.

(6)

(iii) Explain how the secure treatment and disposal of waste can be achieved.

(8)

(c) A rare-earth mine and processing operation was described in a recent press-release by a pressure group as:

- rapid 24/7 open-cast extraction of all materials, including rare-earth ore
- large numbers of local workers employed in mine and processing plant
- local community dependent on income generated by the mining operation
- mounds of radio-active elements around mine
- old mining area is a scar on the landscape
- ponds of acid residue outside processing plant.

Develop a sustainable management plan to address the issues identified in this press-release.

(9)

(Total for Question 1 = 30 marks)

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2 Study Figure 2(a) which shows the use of global resources, and Figure 2(b) which shows world population growth.

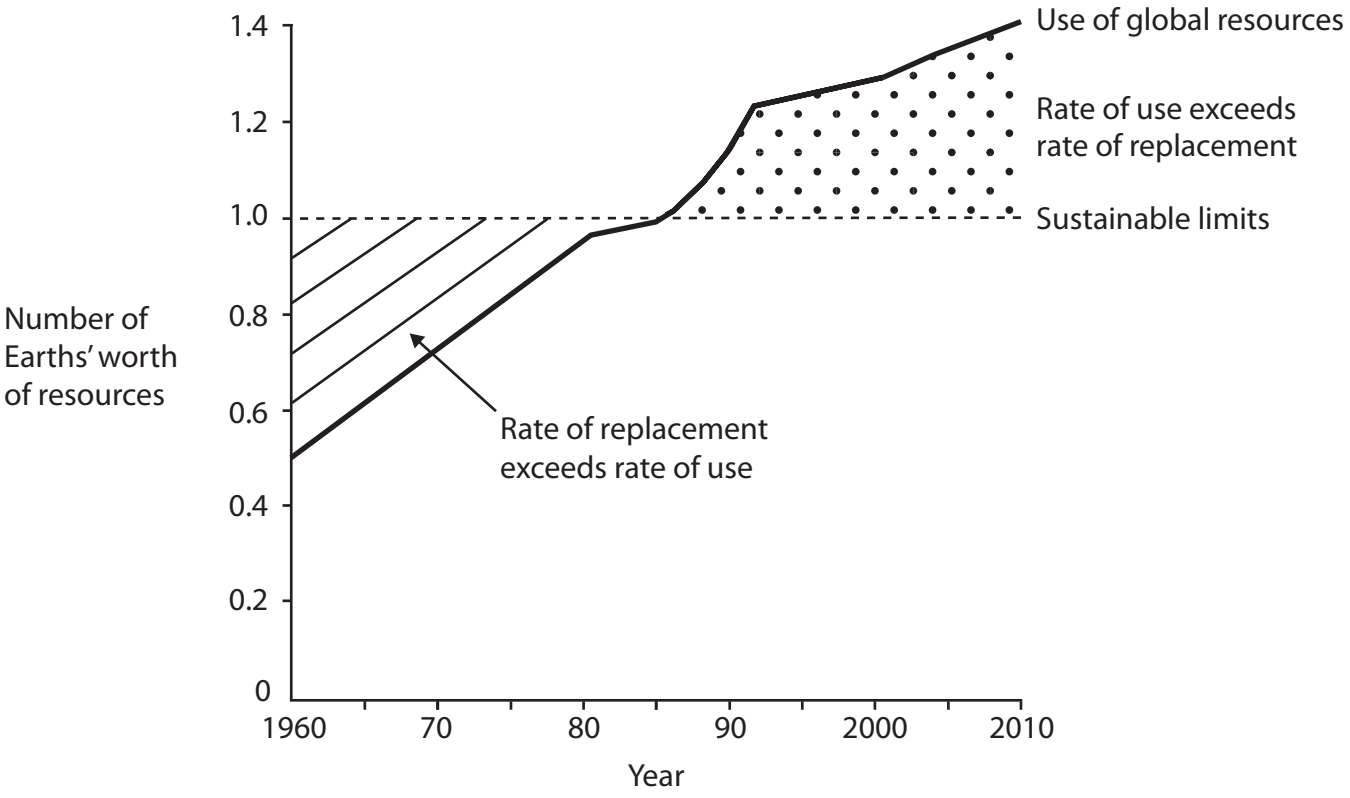

Figure 2(a)

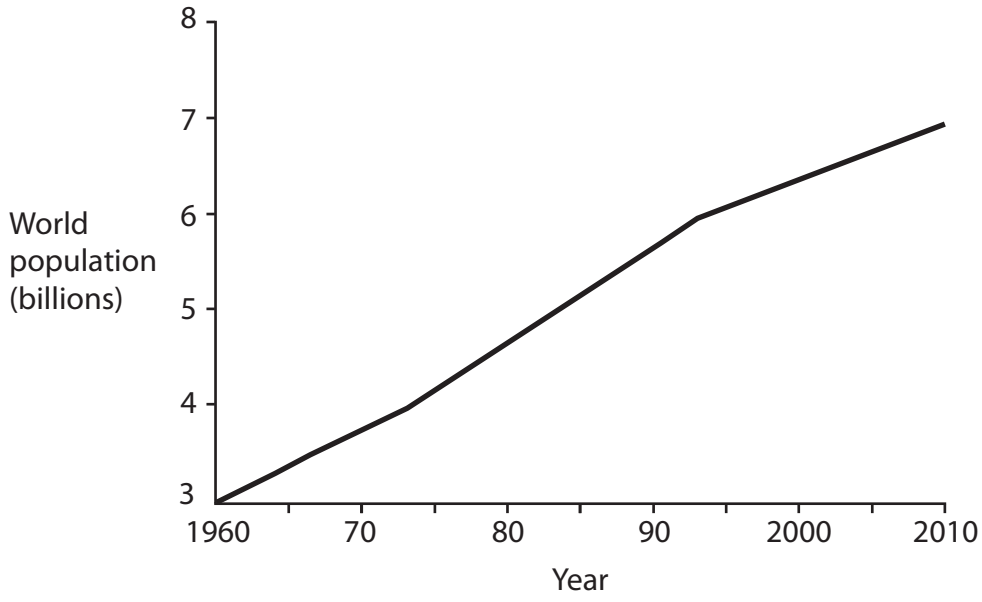

Figure 2(b)

(a) (i) Describe the relationships between population growth and resource use, as shown in Figures 2(a) and 2(b). You should use data from the graphs in your answer.

(4)

(ii) Explain the relationship between the use of resources shown in Figure 2(a) and economic development.

(6)

(b) Explain your recommendations for achieving greater SRD for the Earth's natural resources.

(10)

(Total for Question 2 = 20 marks)

TOTAL FOR PAPER = 50 MARKS

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