

BOARD OF STUDIES  
NEW SOUTH WALES

HIGHER SCHOOL CERTIFICATE EXAMINATION

1998  
**SCIENCE FOR LIFE**  
2 UNIT

*Time allowed—Two hours  
(Plus 5 minutes reading time)*

**Directions to Candidates**

**Section I—General**

- Attempt ALL questions.
- **Part A** 10 multiple-choice questions, each worth 1 mark.  
Complete your answers in blue or black pen, or in pencil on the Answer Sheet provided.
- **Part B** 5 questions, each worth 3 marks.  
Answer this Part in the Part B Answer Book.
- Write your Student Number and Centre Number on the cover of each Answer Book.
- You may keep this Question Book. Anything written in the Question Book will NOT be marked.

**Section II—Modules**

- Attempt THREE questions.
- Each question is worth 15 marks.
- Answer each question in a separate Answer Book.
- Write your Student Number and Centre Number on the cover of each Answer Book.
- Write the Course, Module Name, and Question Number on the cover of each Answer Book.
- You may ask for extra Answer Books if you need them.
- Board-approved calculators may be used.

**SECTION I—GENERAL**

(25 Marks)

**PART A**

Attempt ALL questions.

Each question is worth 1 mark.

Select the alternative A, B, C or D that best answers the question.

Complete your answers in blue or black pen, or in pencil on the Answer Sheet provided.

1. Look at the following table.

## NSW DROWNING 1996

Under 5 years
---------------

3	private pool
2	lake
1	bath
1	public pool

6–14 years
------------

4	river
1	bath
1	harbour
1	private pool
1	public pool

15–25 years
-------------

6	river
5	beach
2	lake
1	harbour

26–54 years
-------------

19	beach
12	river
7	bath
5	lake
5	harbour
2	ocean
1	private pool

In NSW in 1996, the most likely place for a seventeen-year-old to drown was

- (A) in a public pool.
- (B) in a private pool.
- (C) at a beach.
- (D) in a river.

2. Which of the following problems is most easily solved by advances in science and technology?
- (A) Pollution from cars  
 (B) Drug abuse  
 (C) Overpopulation  
 (D) Starvation among humans
3. The table below shows data related to the occurrence of a disease called whooping cough.

WHOOPING COUGH CASES AND DEATHS 1970–1979

<i>Year</i>	<i>Reported cases</i>	<i>Deaths</i>
1970	655	5
1971	205	4
1972	270	2
1973	365	4
1974	390	0
1975	1 100	5
1976	2 500	20
1977	5 000	20
1978	9 000	30
1979	13 100	40

*Internet website:*

<http://www.skeptics.com.au/journal/anti-immune.html>

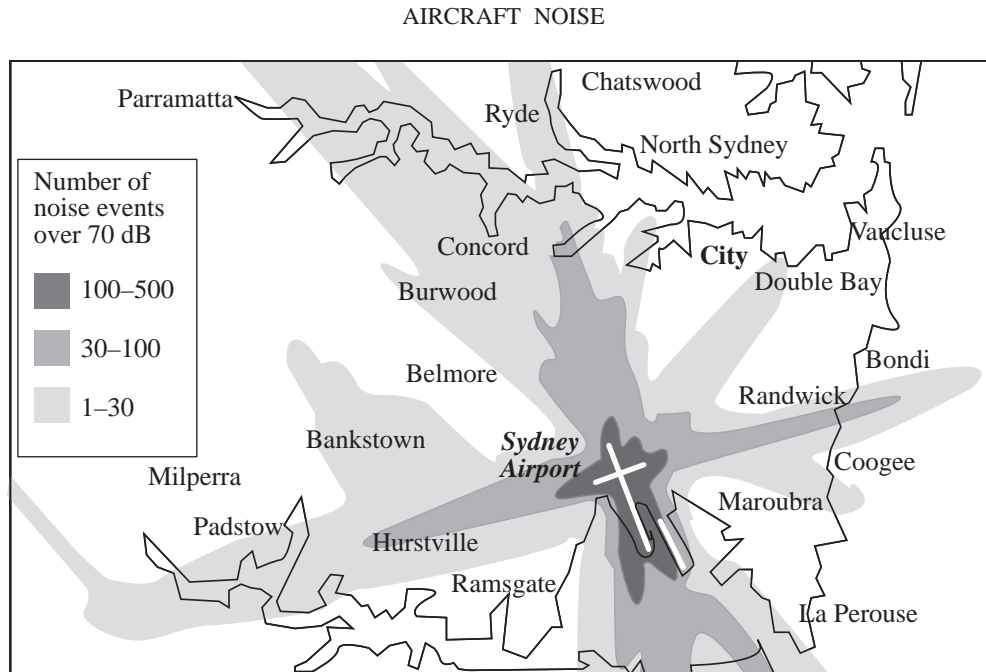
For the years 1970–1979, it shows the number of cases reported as well as the number of deaths caused by whooping cough.

During 1974–1975 many people stopped immunising their children against whooping cough.

From the table it can be concluded that

- (A) the number of reported cases of whooping cough increased steadily from 1970 to 1974.  
 (B) the number of reported cases of whooping cough will reach 25 000 in 1980.  
 (C) the number of reported cases of whooping cough increased after 1974 because everyone stopped immunising their children.  
 (D) the percentage of reported cases resulting in deaths decreased between 1977 and 1978.

4. The chart below shows information about aircraft noise heard by people living near Sydney's international airport.

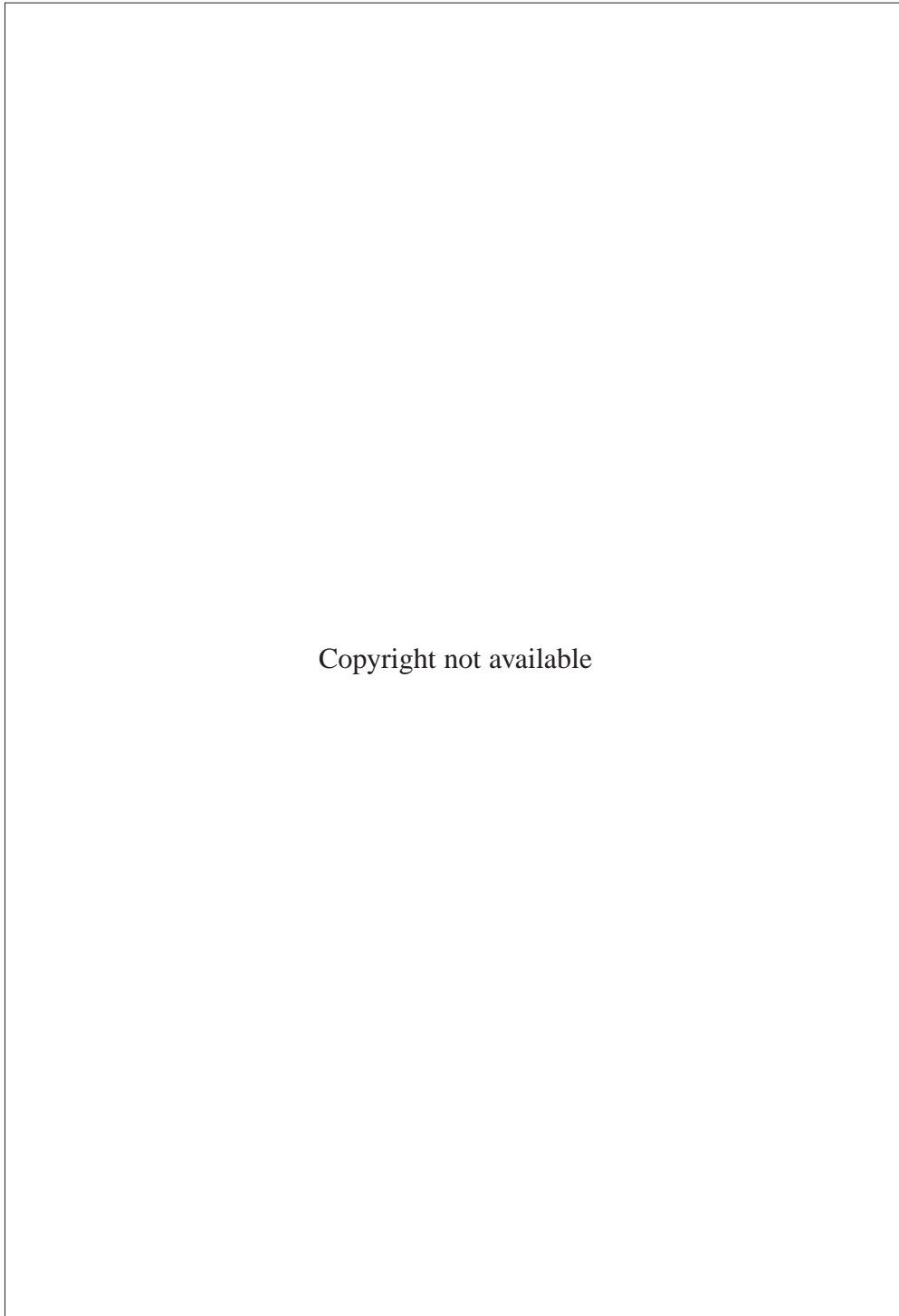


*Noise levels surrounding Sydney airport flight paths, Sun Herald, November 30, 1997, p 35*

On which of the following straight-line journeys would you be MOST likely to hear aircraft noise louder than 70 dB?

- (A) Ramsgate to Bankstown
- (B) Bondi to Vaucluse
- (C) Ryde to Double Bay
- (D) Milperra to Belmore

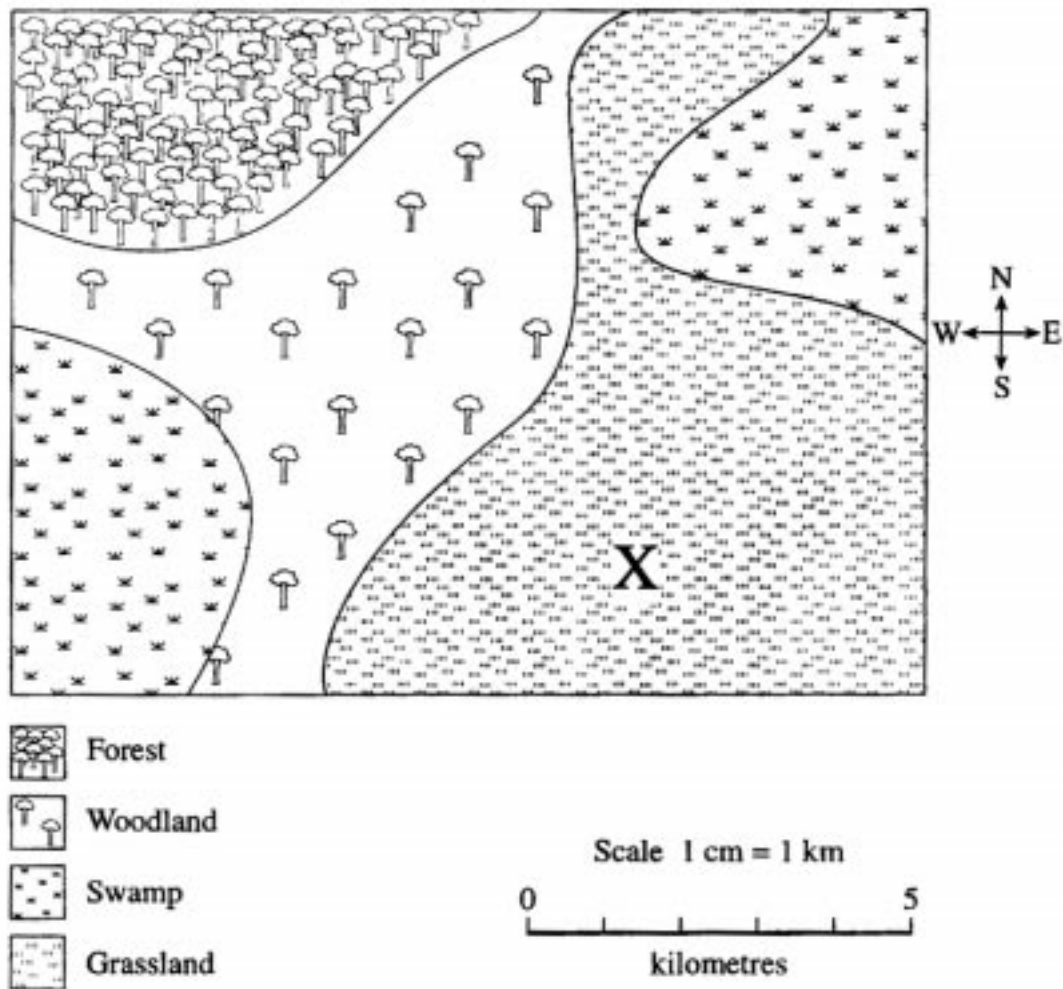
5. The picture below shows a bird observed near your home.



The bird observed is most probably

- (A) an Australian raven.
- (B) a Black currawong.
- (C) a Little raven.
- (D) a Little crow.

6. The map below shows the area where a group of students went on an excursion.



The group of students started walking at point X. They walked 2 km north, then 3 km west and finally 2 km south-east. Where were they at the end of this walk?

- (A) Forest
- (B) Woodland
- (C) Swamp
- (D) Grassland

7. Use the information in the table to answer the question below.

CAR COMPARISON

<i>Car</i>	<i>Nebula</i>	<i>Orion</i>	<i>Eagle</i>
<b>Price</b> (dollars)	31 400	33 980	32 617
<b>Power</b> (kW/r.p.m.)	141/5200	147/5200	157/4900
<b>Torque</b> (N m/r.p.m.)	279/4400	304/3600	357/3000
<b>Acceleration</b> (seconds)			
60–100 km/h	6.3	7.0	6.7
0–100 km/h	9.2	9.8	9.2
Standing 400 metres	16.7	16.9	16.6
<b>Fuel consumption</b> (litres/100 km)			
City	13.8	15.8	15.7
Highway	10.5	12.7	12.0
Overall	11.6	13.7	13.2
<b>Braking</b> 80–0 km/h (metres)	29.8	31.7	33.1

*Open Road Nov/Dec 1997, NRMA, p 12*

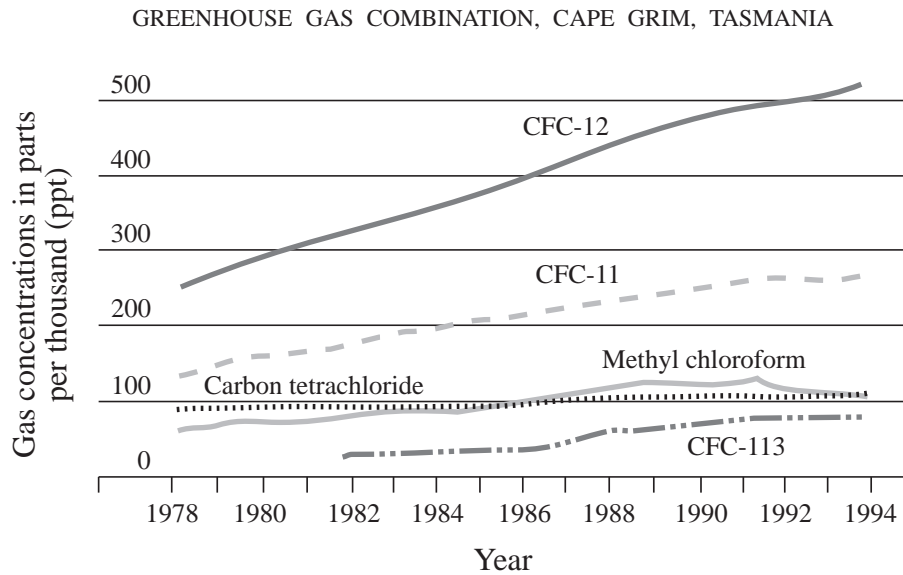
An Orion is driven on the highway from Forbes to Orange. Orange is about 105 km from Forbes. The amount of fuel used by the Orion on this trip would be closest to

- (A) 11 L  
 (B) 13 L  
 (C) 16 L  
 (D) 1270 L
8. Silica dust is known to cause cancer in the lungs. Workers on building sites who drill through sandstone or quartz are exposed to silica dust. Passers-by are not exposed to large amounts of silica dust.

Scientists should recommend

- (A) that no drilling occur on building sites.  
 (B) that new buildings be made with sandstone or quartz.  
 (C) safe levels for allowable amounts of dust on building sites.  
 (D) experiments on humans to see if silica dust causes cancer.

9.



This graph shows that the concentration of

- (A) methyl chloroform in 1990 was 130 ppt.  
 (B) carbon tetrachloride in 1984 was 110 ppt.  
 (C) CFC-113 in 1980 was 0 ppt.  
 (D) CFC-12 in 1992 was 330 ppt.
- 10.** A virus called the Epstein Barr virus causes glandular fever in humans. People infected with this virus keep it in their bodies for life but it may not make them sick. It is spread by the transfer of saliva between individuals. Saliva can be transferred when people kiss. This is why it is called the 'kissing disease'.

From this information you could say that

- (A) everyone with the Epstein Barr virus will become ill with glandular fever.  
 (B) kissing involves the risk of infection by the Epstein Barr virus.  
 (C) saliva transferred by kissing is kept in the body for life.  
 (D) kissing will cause glandular fever.



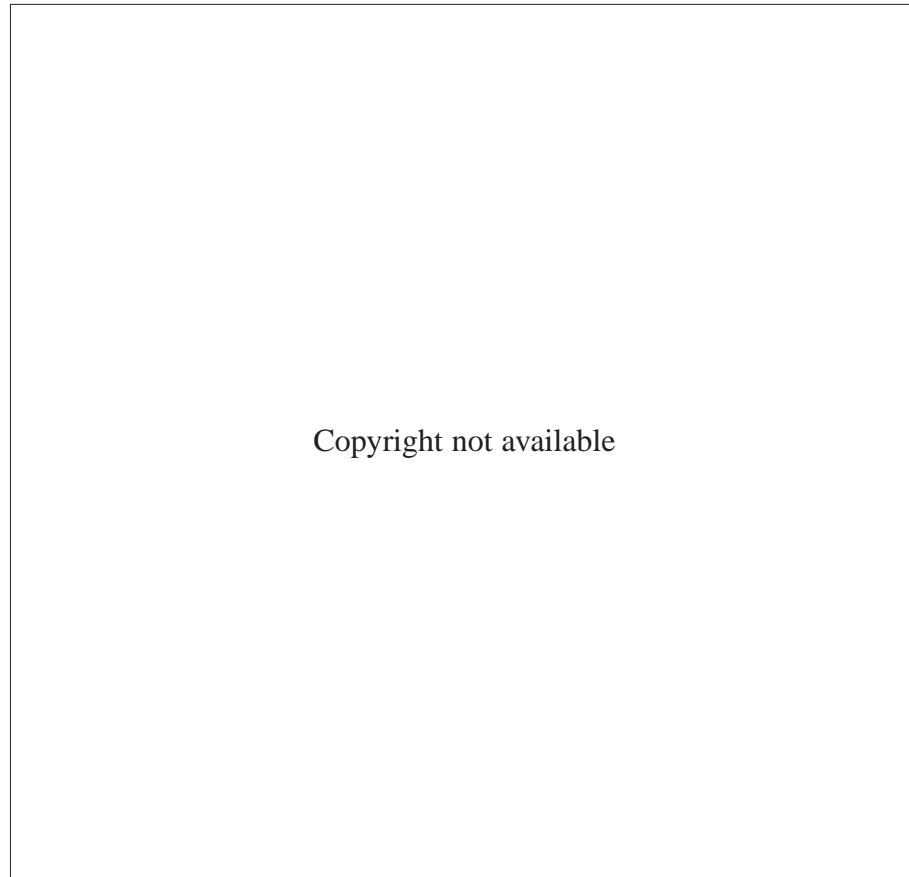
**PART B**

Attempt ALL questions.

Each question is worth 3 marks.

Answer all questions in the Part B Answer Book provided.

11. El Niño is the name given to a climatic pattern that occurs in some years but not others.



- (a) Complete the following table in the Part B Answer Book to show sea temperatures during an El Niño year.

	Near Australia	Near South America
Sea temperature		

- (b) Describe the effect of El Niño on the surface winds over the Pacific Ocean.
- (c) Suggest a reason why El Niño causes drought in Australia.

12. Vanessa had to design an experiment as part of a major project. She decided to test how quickly various packaging materials broke down (biodegraded).

- (a) The table below shows the masses of four packaging materials before and after they were buried.

<i>Packaging materials</i>	<i>Glass</i>	<i>Cardboard</i>	<i>Paper</i>	<i>Plastic</i>
Mass before (g)	10.0	10.0	10.0	10.0
Mass after (g)	10.0	3.4	1.5	9.9

Put the materials in order from MOST biodegradable to LEAST biodegradable.

- (b) Vanessa buried samples of each material. She decided to check them after two weeks. All the samples were buried in the same type of soil. Describe TWO other things that she should do to make her comparison fair.

13.

#### DNA FINGERPRINTING PROCEDURE

DNA fingerprints, like conventional fingerprints, are used to identify an individual in a large population. To obtain a DNA fingerprint of an individual, scientists first extract DNA from a tissue sample—blood, skin, hair, semen, etc. They then cut the DNA into pieces using an enzyme. This results in a mixture of DNA segments of many different sizes. These fragments are sorted according to size using a technique called electrophoresis. The DNA is then labelled with a radioactive gene probe. An X-ray picture is made of the pattern of bands. No two people, with the exception of identical twins, have the same DNA fingerprint.

© Australian Biotechnology Association

- (a) Draw a flowchart to show only steps 2, 3 and 4 in the DNA fingerprinting procedure.
- (b) A murder victim was found holding a handful of hair.

The hair produced the same DNA fingerprint as a blood sample taken from a suspect, Marilyn.

Can you be sure that this hair belonged to Marilyn? Explain.

14. Franz had a lung disease. He was going to do a test to see whether taking a drug increased the volume of air he could breathe out. The effects of the drug last for only about five minutes. Four tests were suggested.

Test 1. First measure the volume Franz breathed out without the drug. Then give Franz the drug and measure the air breathed out.

Test 2. First measure the volume Franz breathed out without the drug. Then give Franz the drug and measure the air breathed out. Then, wait ten minutes and again measure the volume of air breathed out by Franz.

Test 3. First measure the volume Franz breathed out without the drug. Then give Franz the drug and measure the air breathed out. Then, have Franz exercise for ten minutes and again measure the volume of air breathed out by Franz.

Test 4. Randomly select twenty people. Measure volume breathed out. Give the drug to ten of these people. Measure the volume breathed out by all twenty people. Compare the volumes of air breathed out by those with the drug and those in the control group.

Which test would be the best way to find out if the drug affected the volume of air breathed out by Franz? Explain why this is the best test.

15. Dimitra was riding her bike. Maris collected the data shown below.

<i>Time</i> (s)	<i>Speed</i> (m/s)
0	0
2.5	2.5
7.5	6
15	8
20	10
25	10

- (a) Use the data to draw a graph in the Part B Answer Book.
- (b) Maris said that Dimitra started to slow down after 20 seconds. Do you agree? Explain.

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**SECTION II—MODULES**

(45 Marks)

Attempt THREE Modules.

Each question is worth 15 marks.

Answer each Module in a separate Module Answer Book.

	Pages
QUESTION 16. FASHION AND SCIENCE .....	14–15
QUESTION 17. HORTICULTURE .....	16–17
QUESTION 18. THE HUMAN BODY .....	18–20
QUESTION 19. SCIENCE FICTION .....	21–22
QUESTION 20. SCIENCE OF TOYS .....	23–25
QUESTION 21. SPORT SCIENCE .....	26–28
QUESTION 22. DISASTERS .....	29–30
QUESTION 23. MANAGING NATURAL RESOURCES .....	31–33
QUESTION 24. MARINE OR RIVER STUDIES .....	34–35
QUESTION 25. BIOTECHNOLOGY .....	36–37
QUESTION 26. COMMUNICATIONS .....	38–40
QUESTION 27. CONSUMER SCIENCE .....	41–42
QUESTION 28. SPACE SCIENCE .....	43–44

**QUESTION 16. Fashion and Science****Marks**

- (a) The risk of lead poisoning through the use of cosmetics was recognised by the ancient Greeks. Yet the use of face powder containing high amounts of lead was still fashionable among them. **3**

- (i) Name ONE fashion, other than face powder in ancient Greece, that has a damaging effect on the environment.
- (ii) Describe the damaging effect of this fashion.
- (iii) What is ONE way the users of this fashion could minimise this damaging effect?
- (iv) Why do some people still follow fashions, even though they may have damaging effects?

- (b)

**SWIMWEAR REVOLUTION****3**

The Aussie cossie has come a long way. It is now high fashion, high-tech, and environmentally sound. A lot of scientific research and artistic design goes into designing a swimsuit. Technology has really changed the way we do things.

*© The Daily Telegraph 19 September 1996, Evie Gelastopoulos*



- (i) For swimsuits, or another fashion, describe how science and technology have changed this fashion.
- (ii) Explain how a factor other than science and technology has influenced this fashion.

**Question 16 continues on page 15**

## QUESTION 16. (Continued)

Marks

(c)

## BARBIE DOLL REVOLUTION

3

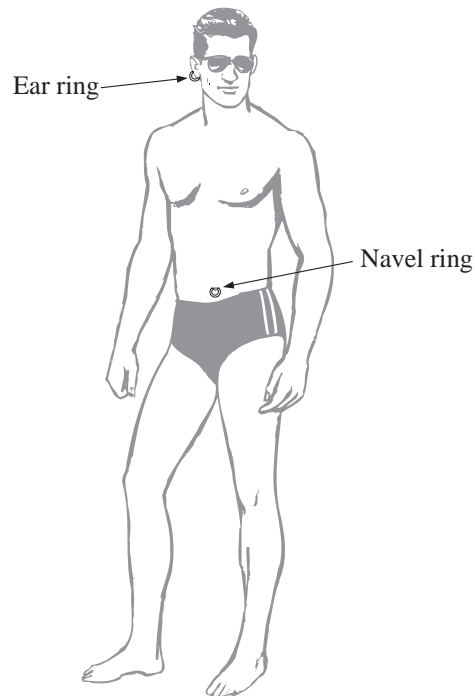
From 1998 the Barbie doll will have a smaller bust, thinner hips, and be larger in size. Her mouth will be closed, her eyes will have less makeup and she will have a smaller nose.

This will be the fourth time Barbie has been changed since her creation in 1959.

- (i) Suggest TWO cultural reasons that may have influenced the changes.
- (ii) Predict ONE feature that the doll may have in the future. Explain your answer.

- (d) Body piercing and body branding are current fashions. Many people participate in these fashions, yet many other people find them very unattractive.

6



- (i) If people have such different attitudes to these practices, can it be called a fashion? Explain.
- (ii) What TWO factors would influence people to participate in these practices? Explain.
- (iii)
  1. Write three questions you could use in a survey to determine why people are following this fashion. Explain why you have chosen ONE of these questions.
  2. Describe the sample you would use for your survey.

**End of Question 16**

**QUESTION 17. Horticulture****Marks**

- (a) **PLANTS MADE TO ORDER** **2**
- Scientists are using genetic engineering to develop plants to suit the needs of growers and industry.
- A paper company wants straighter eucalyptus trees, to produce pulp for paper manufacturers. A research company is looking for plants with larger root systems that thrive in desert conditions.
- © The Daily Telegraph, January 24 1997
- (i) Why would straighter trees, OR larger roots be an advantage?
- (ii) Give another example to show how scientists solve problems of growers or industry.
- (b) Throughout NSW there are many public gardens where a variety of plants can be found. **3**
- (i) Suggest TWO reasons why public gardens are maintained.
- (ii) Describe ONE problem with growing plants in a public garden.
- (c) In Australia, large areas of land are left untouched as wilderness areas. Many people feel that this is a waste and that the land should be cleared and developed. **2**
- Give TWO reasons for preserving plants in wilderness areas.
- (d) Within a wilderness area, scientists recently discovered a native grass that grows quickly and produces seeds high in protein. This grass grows in poor soil and areas of low rainfall. The scientists want to know if the yield (amount of seeds produced) can be increased by using fertiliser. **3**



Design an experiment to see if the yield can be improved.

**Question 17 continues on page 17**



## QUESTION 17. (Continued)

Marks

- (e) A farmer grows 5000 lettuce in a cold climate where lettuce do not normally grow during winter. He grows these lettuce in a greenhouse. To control pests on the lettuce, he uses the insecticide 'Labatticide'. The label of 'Labatticide' is shown below. 5

**LABATTICIDE**

*An insecticide for controlling thrips,  
bugs, moths, grasshoppers, crickets,  
spiders and fruit fly.*

**Directions for use:**  
Mix 8 mL per 10 L of water.  
Spray thoroughly when pests are seen.

**Comments:**

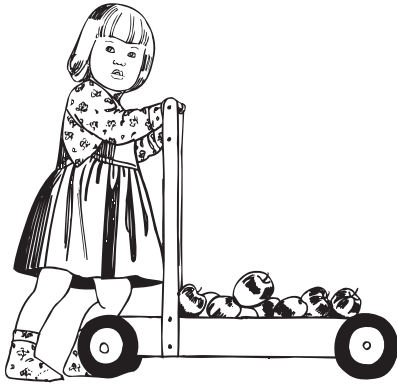
1. Fortnightly spraying is recommended.
2. Do not pick vegetables for 7 days after spraying.

- (i) Why would the farmer want to grow lettuce during winter?
- (ii) State ONE advantage and ONE disadvantage of using a climate-controlled greenhouse for growing lettuce.
- (iii) The farmer uses a 100 L spray tank for spraying insecticide. How much Labatticide must he add to the tank to make the correct concentration?
- (iv) The label says, 'do not pick vegetables for 7 days after spraying'. Give ONE reason for this.

**End of Question 17**

**QUESTION 18. The Human Body****Marks**

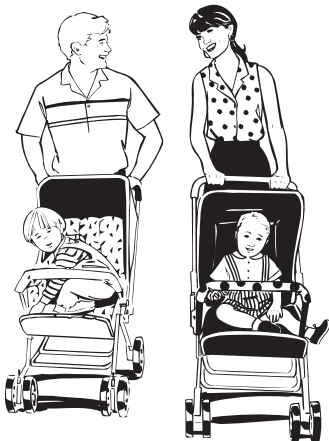
- (a) The illustrations below show people taking part in activities that are typical of different stages in life. **3**



W



X



Y



Z

- (i) Name the stages W and Z.
- (ii) Why do people's activities differ at the various stages of their lives? Use examples of TWO developmental stages in your answer.
- (iii) Describe ONE major physical change that takes place as a person grows from the stage you have chosen, to the next stage.

## QUESTION 18. (Continued)

Marks

- (b) Work and leisure form a large part of a person's lifestyle. A few examples of work and leisure activities are shown below. 3



Use the activities shown, or any others of your choice, to answer the following.

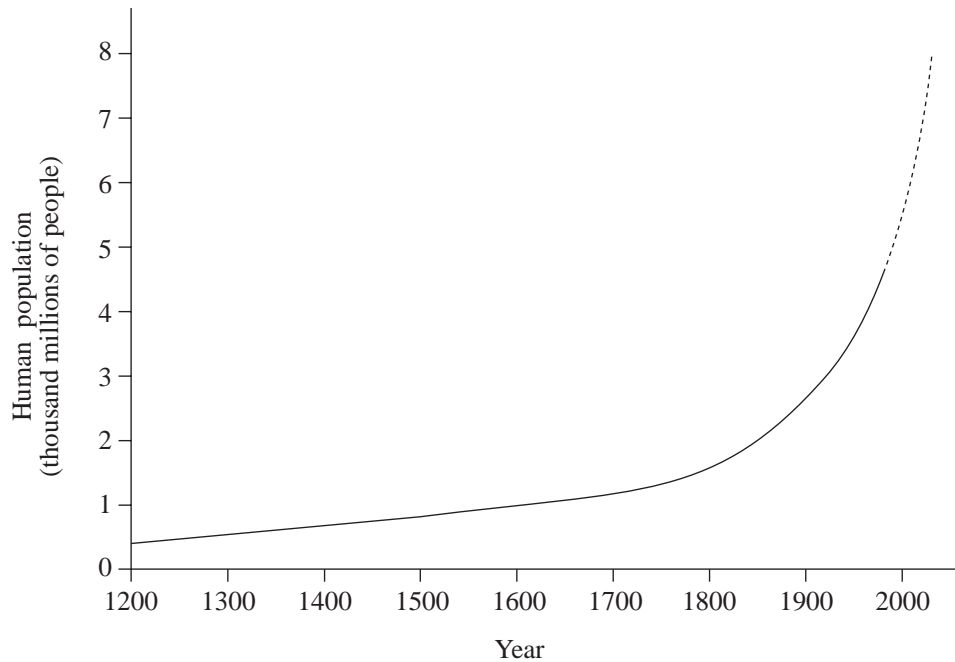
- (i) Name ONE activity and explain how it can have a positive effect on a person's physical health.
  - (ii) Name ONE activity and explain how it can have a positive effect on a person's mental health.
  - (iii) Name ONE activity and explain how it can have a negative effect on a person's physical OR mental health.
- (c) Some diseases can be cured, others cannot. Some diseases can be passed from one person to another. Others cannot. 3
- (i) Name ONE disease.
  - (ii) How do people get this disease?
  - (iii) Explain how our knowledge of this disease has helped to cure it OR prevent it from spreading.

## QUESTION 18. (Continued)

Marks

(d)

6



The graph shows the number of people living on Earth from the year 1200 to the year 2000.

- (i)
  1. What was the approximate population in the year 1200?
  2. How long did it take for the population to double this value?
- (ii)
  1. How have people had an impact on the biosphere? List **THREE** ways.
  2. Use the information in the graph to explain why the effect of people on the biosphere has increased rapidly in the past 150 years.
  3. Will the effect of humans on the biosphere increase or decrease in the future? Explain.

**End of Question 18**

**QUESTION 19. Science Fiction****Marks**

- (a) The cartoon below suggests that contact with extra-terrestrials would be violent. **2**

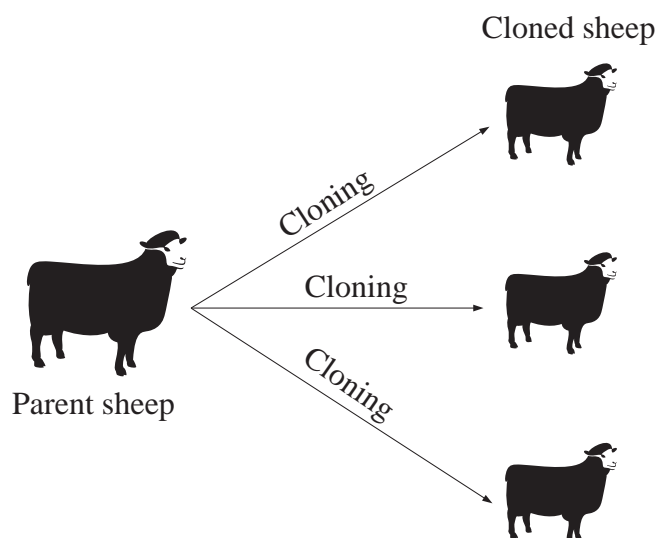


- (i) Suggest why interaction with extra-terrestrials is portrayed this way.
- (ii) The idea of extra-terrestrials is common in science fiction. Why is the existence of extra-terrestrials so difficult to prove?
- (b) In the movie '*Honey I shrunk the kids*' a device accidentally reduces children to the size of insects. **6**
- (i) How would this change in size affect the structure and function of the children?
- (ii) A device to shrink humans down to the size of insects has never been invented.
1. Give an example of a device that first appeared in science fiction and has become part of everyday life.
  2. Explain how ONE scientific idea contributes to the function of this device.
- (iii) 1. Name and describe a device from science fiction that is unlikely to become part of everyday life.
2. Explain why this device is unlikely to become part of everyday life.

## QUESTION 19. (Continued)

Marks

- (c) Cloning is a common idea in science fiction. In cloning, an organism can be produced that is identical to its parent. 2



Scientists have recently cloned a sheep. In many countries scientists have been banned from attempting to clone humans.

Cloning of humans is NOT part of everyday life. Give TWO reasons for this.

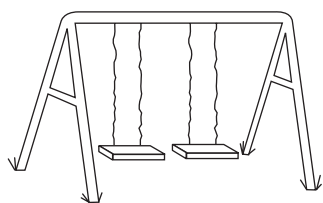
- (d) (i) Describe ONE idea or device from science fiction *other than cloning* that you think would be harmful if it were real. 2
- (ii) Explain why you think the effects would be harmful.
- (e) In Isaac Asimov's Foundation series of books, some robots and humans can read people's thoughts. Some psychics claim they can read minds. 3

Design an investigation to test the claim that a psychic can read people's thoughts.

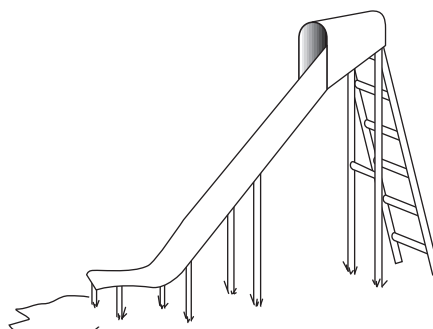
**End of Question 19**

**QUESTION 20. Science of Toys****Marks**

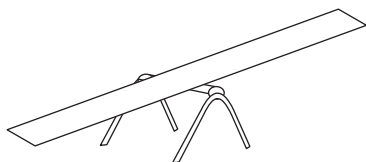
(a) Below are four common playground equipment items.

**3**

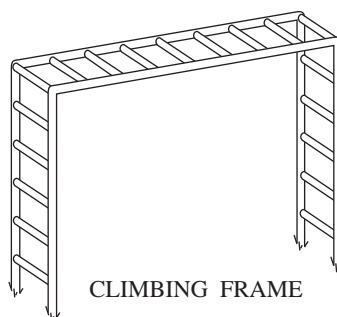
SWING



SLIPPERY DIP



SEE-SAW



CLIMBING FRAME

Select TWO of the playground equipment items.

- (i) Name the items.
- (ii) For each item, describe TWO safety precautions.
- (iii) For each item, explain ONE scientific principle involved in the safe use of the equipment.

**Question 20 continues on page 24**

QUESTION 20. (Continued)

Marks

- (b) The Tamagotchi is one of the toys that has been nominated for ‘The Toy of the Year’ Award. 5



You have been asked to judge ‘The Toy of the Year’ competition.

- (i) Describe THREE criteria you would use to judge the entries.
- (ii) Explain why you would use TWO of these criteria.
- (iii) Name or describe a toy that you think should be given the ‘Toy of the Year’ award. Why should it be given this award?

**Question 20 continues on page 25**

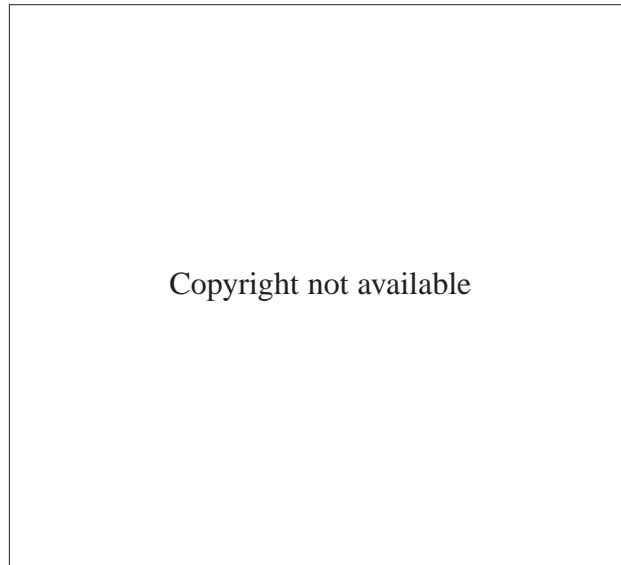


## QUESTION 20. (Continued)

Marks

(c) Look at the cartoon below.

2



'They sold Daddy a used basketball.  
It belonged to a kid named Spalding!'

- (i) Describe ONE physical skill that a child of age 5 could develop by using a basketball.
  - (ii) For a fifteen-year-old, state ONE mental skill that could develop from playing a game of basketball.
- (d) In the USA, air guns and pellet guns are popular toys with children in the 10–14 age range. Dr Colin studied 101 children who were seriously injured by these air guns. She found that, in 71% of cases, the shooting was accidental. Injury to the eyes was the most common form of injury.

5

- (i) State TWO psychological messages that the gift of an air gun may carry.
- (ii) Dr Colin concluded her research by stating that air guns and pellet guns are not toys.  
  
Do you agree? Explain your answer.
- (iii) How would you find out how many children in Australia were injured by air guns in 1997?

**End of Question 20**

**QUESTION 21. Sport Science****Marks**

(a)

**5**

Copyright approval is not available



- (i) Suggest ONE advantage for ballet dancers of having large bones in the legs and feet.
- (ii)
  1. Name a sport other than ballet.
  2. For this sport, explain how a training program could lead to change in the body.
  3. Design an investigation project to find out whether this training program brings about this change.

**Question 21 continues on page 27**

QUESTION 21. (Continued)

Marks

(b)

6

Copyright approval is not available

Copyright approval is not available

**Question 21 continues on page 28**

## QUESTION 21. (Continued)

Marks

- (i) Describe TWO features of an ideal foot for a sprinter.
- (ii) Explain why this foot would be a disadvantage for a marathon runner.
- (iii)
  1. Describe a body type or feature.
  2. Name a sport well suited to this body type or feature. Explain the advantages of this body type for this sport.
  3. Name a sport where this body type or feature would be a disadvantage. Explain ONE disadvantage of this body type or feature for this sport.

(c)

## MUSCLING IN ON BODY OBSESSION

‘Many muscle-bound bodybuilders and athletes mistakenly believe they are puny’, says a study by British and American psychiatrists. Researchers claim to have identified a psychiatric disorder called muscle dysmorphia, which is like anorexia nervosa. This condition involves a person having a false idea of their body shape.

4

People with this condition are often too ashamed of their bodies to go swimming, and many have taken anabolic steroids to build up their muscles.

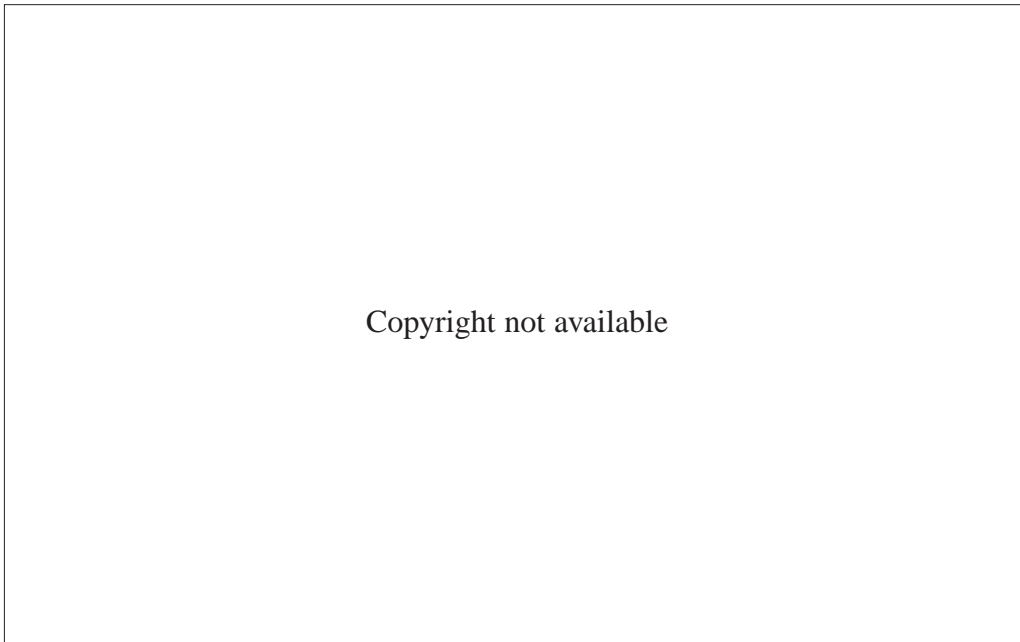
*© The Sunday Telegraph, November 23, 1997, p 29*

- (i) Why do people with muscle dysmorphia do body building?
- (ii) One reason for doing exercise programs is to produce a particular body shape.
  1. Is this a good reason for participating in an exercise program? Explain.
  2. Give a different reason for participating in physical activity. Use an example of a physical activity to explain how this could be achieved.

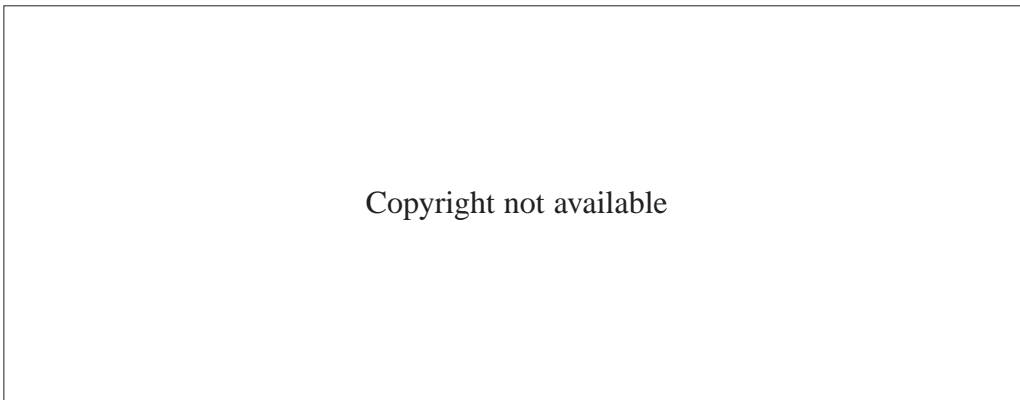
**End of Question 21**

**QUESTION 22. Disasters****Marks**

- (a) A map in a newspaper showed a 'diary' of events that took place worldwide during one week in 1997. **7**



In the table below, different symbols show different types of events.



- (i) From the table, choose ONE event that is a natural disaster. Explain why it is called a natural disaster.
- (ii) Choose a symbol from the table that does not represent a disaster. Explain your answer.
- (iii) One symbol has not been described in the table. Write a possible meaning and example for this symbol.
- (iv) Draw up a table to show how many of each event occurred during the week.
- (v) Which event was most common?

## QUESTION 22. (Continued)

Marks

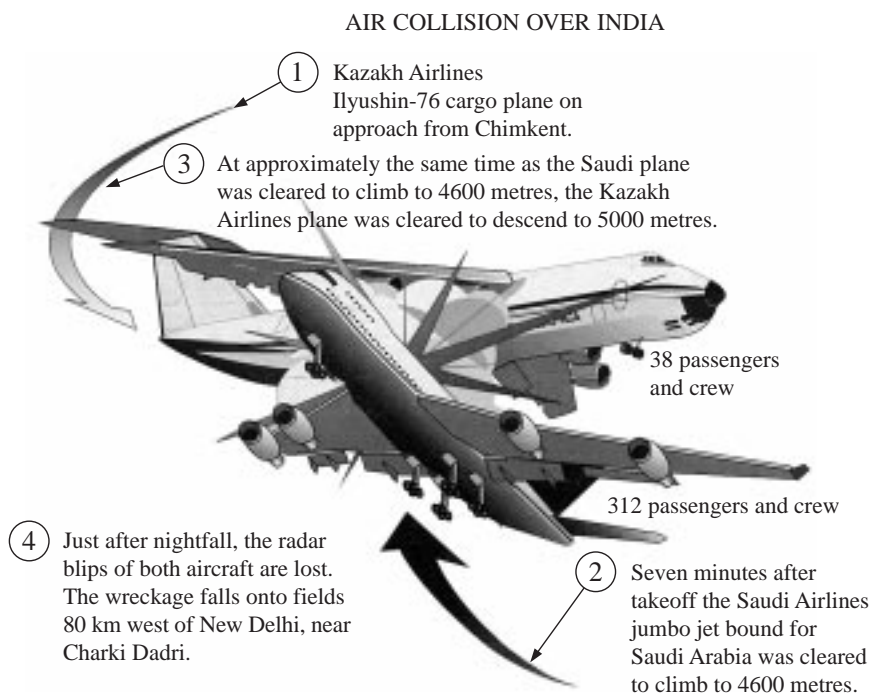
- (b) During the floods in Katherine, Northern Territory, a huge area of land was flooded and hundreds of properties were seriously damaged. 4

However, very few people lost their lives.

- (i) Describe TWO ways in which technology can help to prevent loss of life during a disaster.
- (ii) Name TWO services that would be needed to help victims cope with a disaster. Explain your answer.

- (c) During 1996, two modern jet aircraft collided in midair over India, killing 350 people. 2

Experts believed that the crash may have been the result of a language misunderstanding.



© The Daily Telegraph 14 November, 1996

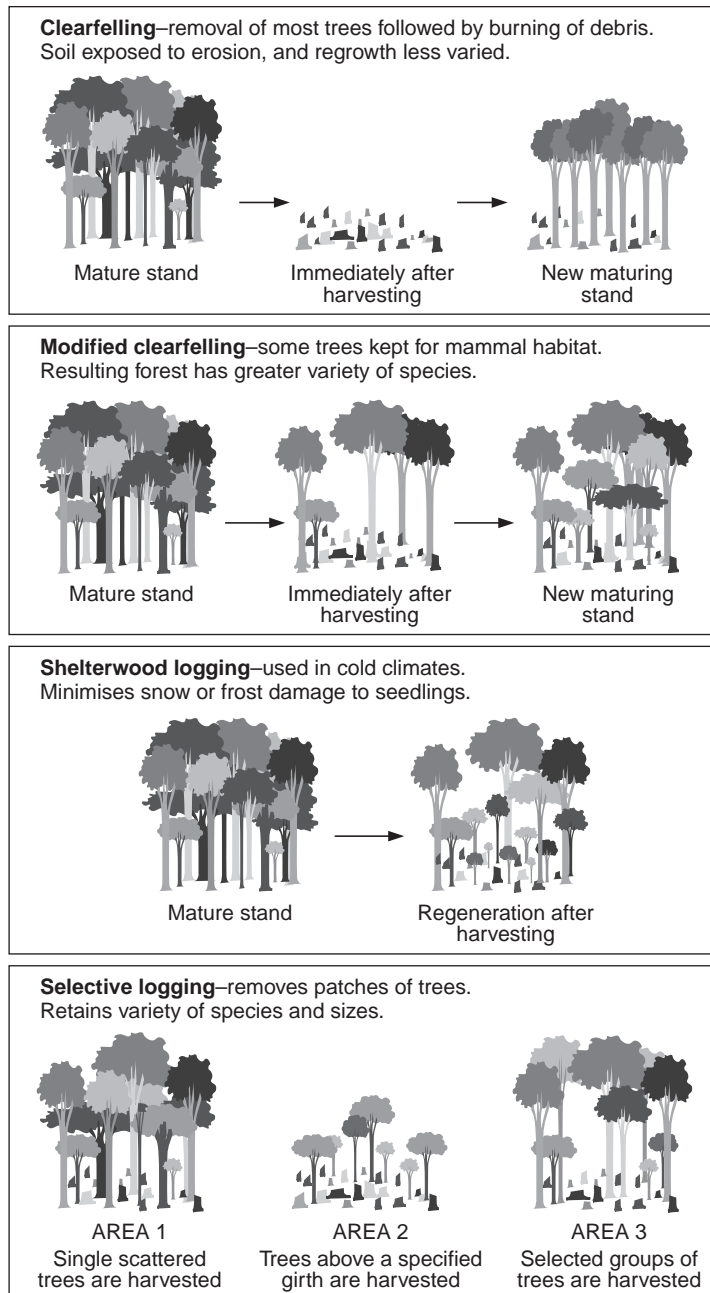
- (i) Was this disaster the result of a failure of people? Explain your answer.
- (ii) What future developments could reduce the risk of another collision being caused in a similar way?
- (d) Use an example of a disaster to explain how failure of materials can cause a disaster. 1
- (e) Use an example of a disaster to explain how failure of technology can cause a disaster. 1

**End of Question 22**

**QUESTION 23. Managing Natural Resources**

**Marks**

- (a) The diagrams below show the effects of different logging methods on forest ecosystems. **3**



*State of the Environment Australia 1996. Diagram logging methods from forest and Timber Inquiry Final Report. Commonwealth of Australia copyright reproduced by permission*

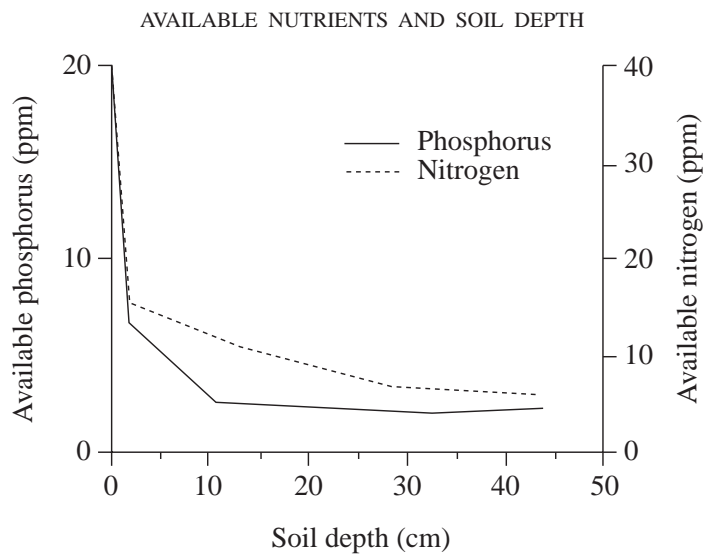
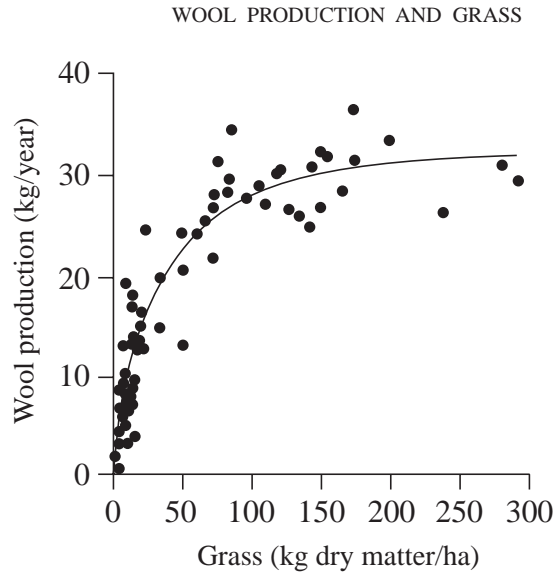
- (i) Which type of logging would be the best? Explain your answer.
- (ii) Which type of logging would be worst for:
1. the logging company? Explain your answer.
  2. the ecosystem? Explain your answer.

**Question 23 continues on page 32**

## QUESTION 23. (Continued)

Marks

- (b) The graphs below provide some information about the wool production, grass available and nutrients in soil in an area of NSW. 5



- (i) What concentration of nitrogen is available at a soil depth of 10 cm?
- (ii) Write ONE hypothesis based on the information from one of the graphs.
- (iii) Design an experiment to test this hypothesis.

**Question 23 continues on page 33**



## QUESTION 23. (Continued)

Marks

- (c) An eight-year-old carries her sister on her back and clutches a bowl of maize — **3**  
her only food for the day. There is, however, enough food produced to feed all the humans on Earth.



- (i) For food, or another resource, explain why people in some countries have a greater store of this resource than people in other countries.
- (ii) For the resource you chose in part (i), could science or technology help to provide a more equal sharing of the resource?

Explain your answer.

- (d) Two hundred years ago wood was the main source of energy used in the home. **4**

Today, there are many sources of energy that can be used in the home.

- (i) List ONE renewable source of energy, *other than wood*, that can be used in the home.
- (ii) List ONE non-renewable source of energy that can be used in the home.
- (iii) Select ONE of these other sources of energy and explain how
1. cost;
  2. environmental consequence;
- will influence the householder in choosing this source of energy for their home.

**End of Question 23**

**QUESTION 24. Marine or River Studies****Marks**

(a)

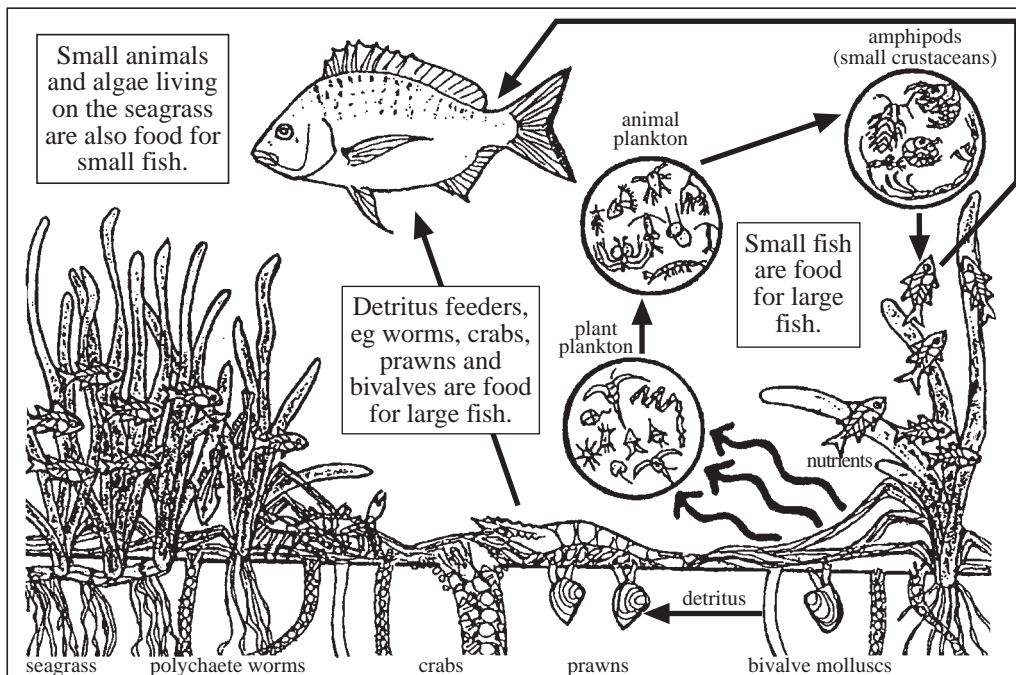
**GLOBAL FISH CATCH****5**

The total global fish catch increased from 5 million tonnes in 1900 to 100 million tonnes in 1990. The 1990 total global fish catch was five times greater than the 1950 total global fish catch.

Although the catch has increased, the fish caught are getting smaller and younger. Scientists are concerned, as their studies show that fish populations are dropping below replacement level.

- (i) Using a vertical scale where 1 cm = 10 million tonnes, draw a column graph to show the total global fish catch in 1900, 1950 and 1990.
- (ii) Suggest TWO reasons for fish populations dropping worldwide.

- (b) Examine the diagram below that shows an important community in which fish reproduce. **3**



*Focus on aquatic environments of the Hawkesbury-Nepean Catchment, Hawkesbury-Nepean Management Trust, 1997, p 17*

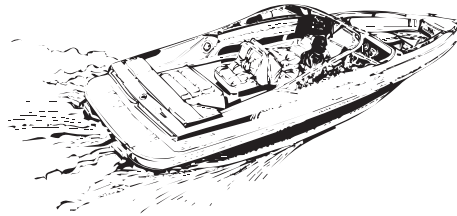
- (i) State ONE way that the large fish depends on the seagrass.
- (ii) A pollutant was introduced that killed off a large number of the animal plankton. Predict the effect of this on:
1. plant plankton;
  2. large fish.

Explain your predictions.

## QUESTION 24. (Continued)

Marks

- (c) A new recreation company is established on a river bank. It provides jet skis for hire, jet boat rides, and water skiing. 7



- (i) Name TWO other water-based recreation activities with which these new recreations might interfere.
- (ii) Which of these activities could still go ahead, even if the river water became polluted? Explain your answer.
- (iii) Name a pollutant that could be added to the water from a recreation activity. What effect might this pollutant have on the waterway?
- (iv) After six months of the company's operation, severe bank erosion is found along a 10 km stretch of river. What action could be taken by the local community to restore the river banks?
- (v) Design an investigation to find out whether the company's activities cause the erosion.

**End of Question 24**

**QUESTION 25. Biotechnology****Marks**

- (a) Natural biological processes have been used by people for their benefit for thousands of years. **2**

Microbes have been used to make bread, brew beer, and make cheese.

- (i) Describe a biotechnology, other than the ones listed above.
- (ii) Explain how this biotechnology has benefited people.

- (b) Consumers can now buy foods that have been altered by biotechnology. **6**

- (i) Describe how a plant or animal product has been improved by biotechnology.
- (ii) Design an advertisement to sell this product to consumers.
- (iii) 1. State ONE concern that consumers might have about such a product.  
2. How would you find out whether this concern was justified?

- (c) Copy and complete the following table. **3**

<i>Biotechnologies can</i>	<i>Example</i>
control biological systems	
alter biological systems	
repair biological systems	

- (d) No two individuals, except identical twins, have the same genetic composition. This fact is used by forensic scientists. They identify individuals by testing small amounts of tissue left at a crime scene. **2**

- (i) Describe ONE advantage of using tissue from suspects to identify criminals.
- (ii) Explain ONE ethical issue that must be considered when using this technology.

QUESTION 25. (Continued)

**Marks**

- (e) In the process of cloning, a single living organism can be used to produce thousands of almost identical copies. **2**

This process has been used in producing copies of nearly extinct plants. Some people want to carry out experiments to see if people can be cloned.

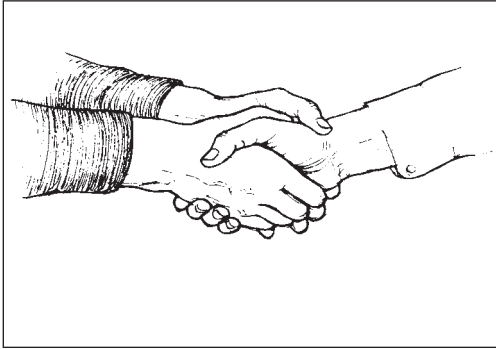
Should these experiments be allowed to go ahead? Justify your answer.

**End of Question 25**

**QUESTION 26. Communications****Marks**

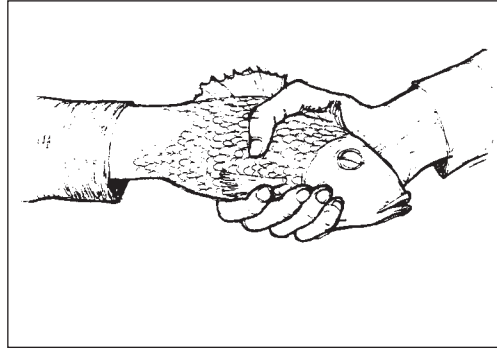
- (a) The information below shows three types of handshakes. A researcher claims that these handshakes are a form of communication. **4**

POLITICIAN'S HANDSHAKE



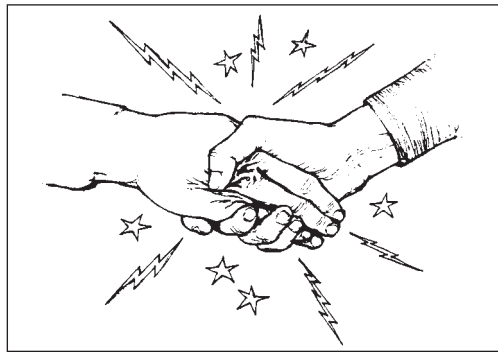
Message: The person is trustworthy.

THE DEAD FISH HANDSHAKE



Message: The person has a weak character.

THE KNUCKLE GRINDER



Message: The person is tough.

*Allan Pease, Body Language, 3rd ed, Sheldon Press, 1997, pp 36-37*

- (i) Are these handshakes a form of communication? Explain your answer.
- (ii) Select ONE of the handshakes above. Design an investigation to test whether this handshake sends the claimed message.

**Question 26 continues on page 39**

## QUESTION 26. (Continued)

Marks

(b)

## MOBILE HEALTH HAZARD?

2

Mobile phones and telecommunication towers emit electromagnetic radiation. Is this a health risk? That is the burning question.

Dr Marilyn Marker has recently conducted research that suggests an increased incidence of childhood leukemia occurs close to telecommunication towers. Telecommunication towers emit radiation at levels similar to mobile phone towers. Also, more than 50 Australians contacted Dr Marker to tell her their mobile phones have given them headaches.

- (i) What evidence is presented in the article to suggest that mobile phones are a health hazard?
- (ii) How convincing is the evidence presented that mobile phones are a health risk? Explain.

- (c) Communication technology has changed over the years. The diagrams below show some changes in telephones. 5



Oldest



Newest

- (i) Name another type of communication.
- (ii) Use labelled diagrams or a description to show TWO ways in which this type of communication has changed.
- (iii) All communication features coding, sending and receiving, decoding, as well as minimising noise.

For the communication you named, describe the:

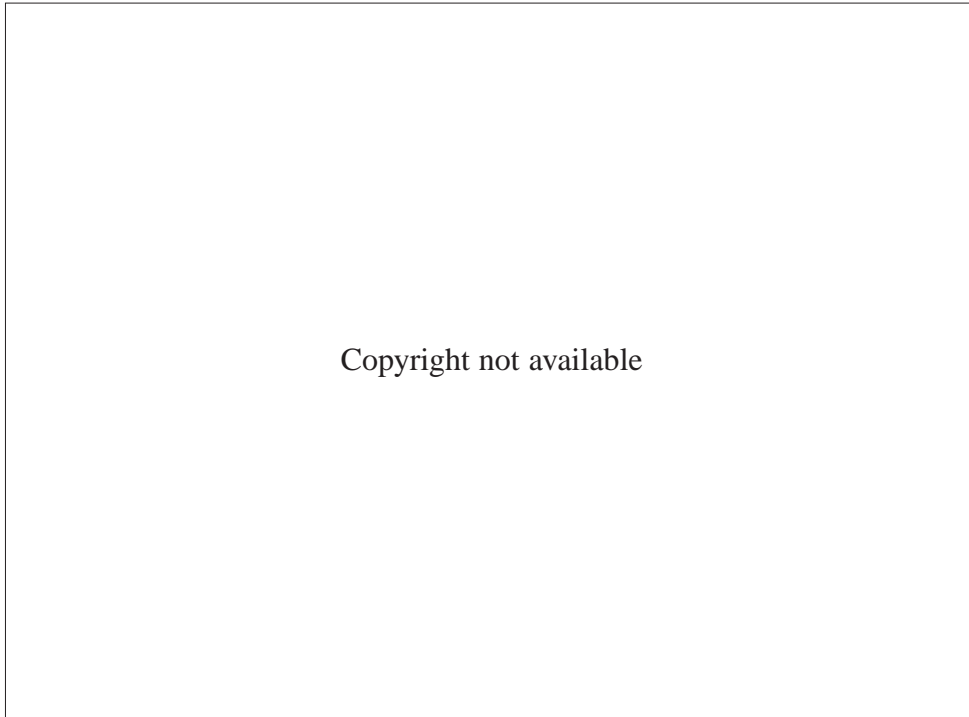
1. sending;
2. receiving;
3. minimising of noise.

## QUESTION 26. (Continued)

Marks

- (d) (i) Describe a communication system. **2**
- (ii) Describe ONE impact of this communication system on society.

- (e) SWITCHING FROM ANALOGUE TO DIGITAL **2**



- (i) In analogue recording, the sound entering the microphone goes through a number of changes until it comes out of the speaker.

How many changes does it undergo?

- (ii) In the information above, two types of waves are mentioned.

Does all communication involve waves? Use an example to explain your answer.

**End of Question 26**



**QUESTION 27. Consumer Science****Marks**

- (a) Many products used in our everyday life have resulted from advances in science and technology. **4**

Choose TWO products that we currently use that were not available 50 years ago. Construct a table using the headings below.

The headings are:

- Product name
- Purpose of product
- How this purpose was achieved 100 years ago
- One environmental impact of product.

Put information about your products into the table.

- (b)

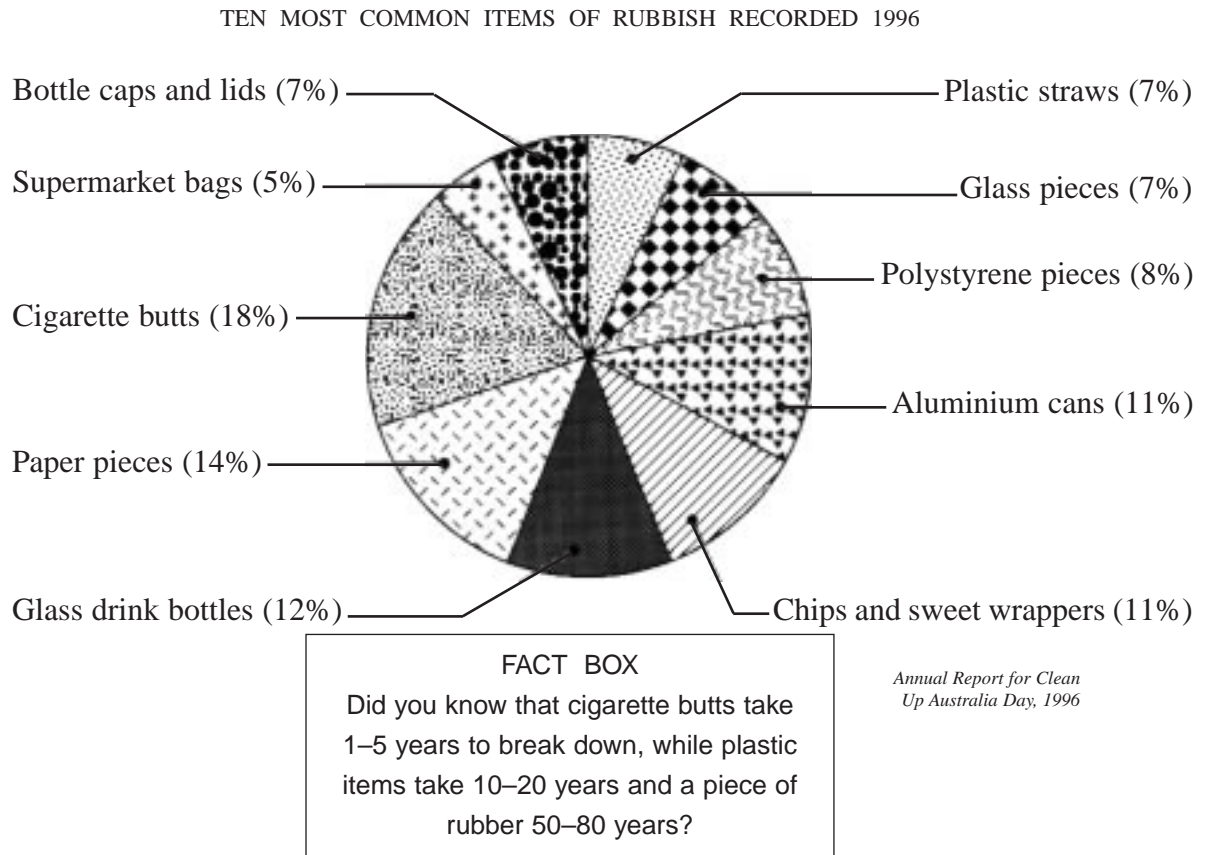
**6**

- (i) Explain why people often believe what is said in this type of advertisement.
- (ii) Laundry stain removers are most often used on white clothes. A quality laundry stain remover should remove dark food stains, oil, and ink stains from a wide variety of soaked clothing. Outline the experimental method that you would use to test some different products for the above criteria. Include
- what it is you would measure;
  - how you would measure it; and
  - THREE variables you would control.

## QUESTION 27. (Continued)

Marks

- (c) Consumerism can have a detrimental effect on the environment, as shown by these data from a Clean Up Australia campaign. **5**

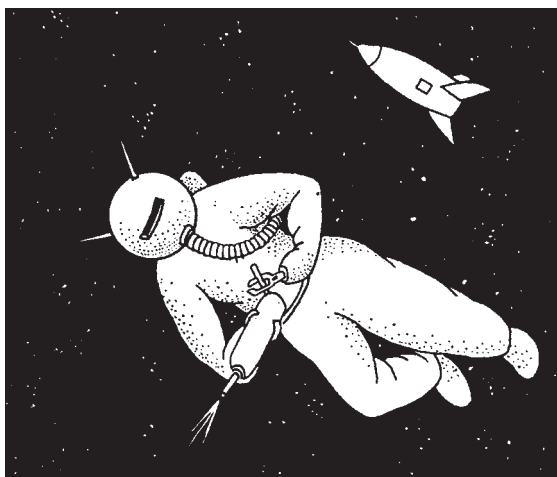


- (i) What was the most common item of rubbish picked up on Clean Up Day?
- (ii) Suggest a reason why this might be the most common item.
- (iii) What kind of consumer goods generate the type of litter shown by the pie chart?
- (iv) Suggest TWO strategies that individuals could use to reduce the harmful effects on the environment of the items in the pie chart.

**End of Question 27**

**QUESTION 28. Space Science****Marks**

(a)

**3**

For many years people have been excited about the idea of space travel.

- (i) Describe ONE incorrect impression people in the past had about space travel.
- (ii) Describe how you would explain to a person why this impression was incorrect.

(b) Space travel creates many problems and dangers for the astronauts.

**3**

- (i) State ONE problem or danger associated with space travel that has been overcome.
- (ii) Explain:
  1. the cause of the problem;
  2. how the problem was solved.

(c) Many people argue that the money spent on space travel would be better used to feed starving people on Earth.

**1**

Do you agree? Explain.

**Question 28 continues on page 44**

## QUESTION 28. (Continued)

**Marks**

- (d) 'Skylab' was a space laboratory that accidentally fell to Earth during the late 1970s. **3**
- (i) What risk is created by pieces of space garbage that fall to Earth?
  - (ii) What risk is created by space garbage that remains in orbit?
  - (iii) What precautions could be taken to reduce the risks from space garbage?
- (e) (i) Name ONE technological development used in everyday life that resulted from space travel research. **2**
- (ii) Explain what role this technological development played in space travel.
  - (iii) Describe how this technological development has had a benefit for people in everyday life.
- (f) Satellites and satellite photographs allow us to look at the Earth from a great distance. **3**

EARTH VIEWED FROM SPACE



- (i) Describe ONE advantage of using satellites to gather data about the Earth.
- (ii) Name ONE type of information, other than weather information, that can be collected using satellites.
- (iii) Explain how this information is used.

**End of paper**