BOARD OF STUDIES
NEW SOUTH WALES

**HIGHER SCHOOL CERTIFICATE EXAMINATION**

# 1999

# GENERAL SCIENCE

## 2 UNIT

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

**DIRECTIONS TO CANDIDATES**

- Board-approved calculators may be used.

**Section I—Core**

- Attempt ALL questions.
- **Part A** 15 multiple-choice questions, each worth 1 mark.
  Complete your answers in either blue or black pen on the Answer Sheet provided.
- **Part B** 10 questions, each worth 3 marks.
  Answer this Part in the Part B Answer Book.
- **Part C** 6 questions, each worth 5 marks.
  Answer this Part in the Part C Answer Book.
- Write your Student Number and Centre Number on each Answer Book.
- You may keep this Question Book. Anything written in the Question Book will NOT be marked.

**Section II—Electives**

- Attempt ONE question.
- Each question is worth 25 marks.
- Answer the question in a SEPARATE Elective Answer Book.
- Write your Student Number and Centre Number on the cover of each Elective Answer Book.
- Write the Course, Elective Name and Question Number on the cover of each Elective Answer Book.
- You may ask for extra Elective Answer Books if you need them.

# SECTION I—CORE

(75 Marks)

Attempt ALL questions.

## PART A

Questions 1–15 are worth 1 mark each.

**Instructions for answering multiple-choice questions**

- Complete your answers in either blue or black pen.
- Select the alternative A, B, C or D that best answers the question. Fill in the response oval completely.

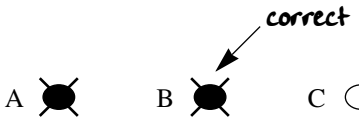
**Sample:** $2 + 4 =$ (A) 2 (B) 6 (C) 8 (D) 9

A ○ B ● C ○ D ○

If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

A ● B ⊗ C ○ D ○

If you change your mind and have crossed out what you consider to be the correct answer, then indicate the correct answer by writing the word **correct** and drawing an arrow as follows.




A ⊗ B ⊗ C ○ D ○

**1** If the Earth rotated faster on its axis, which change would result?

(A) The year would become shorter.

(B) The day would become longer.

(C) The year would become longer.

(D) The day would become shorter.

**2** A full Moon can be seen whenever

(A) the Moon is between the Earth and the Sun.

(B) the Sun is between the Earth and the Moon.

(C) the Moon's whole illuminated side is facing the Earth.

(D) the Earth's whole night-time side is facing the Sun.

**3** What is controlled in a controlled experiment?

(A) The results

(B) The conclusion

(C) The variables

(D) The test sample

**4** A student is standing in a garden watching the weather. Which of the following is NOT an observation?

(A) A storm must be approaching.

(B) I can hear thunder.

(C) I can feel raindrops.

(D) Everything smells fresh.

**5** If a machine's efficiency is 60%, how much energy is needed to do 1200 joules of work?

(A) 480 joules

(B) 720 joules

(C) 1920 joules

(D) 2000 joules

**6** Charles Darwin proposed natural selection as a possible mechanism to explain how evolution occurs. As proposed by Darwin, this mechanism can be best described as

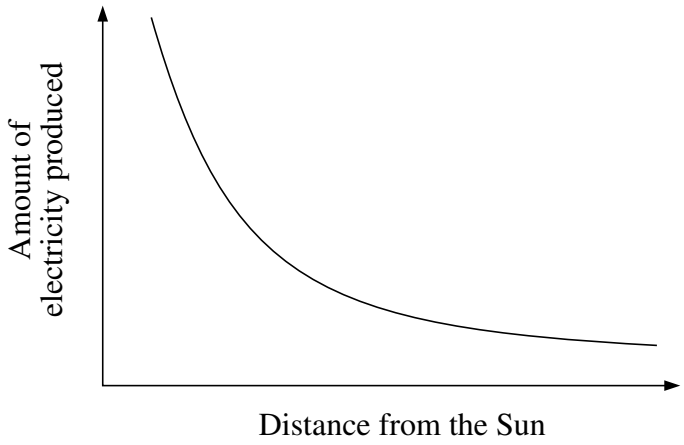
(A) a scientific theory.

(B) a scientific hypothesis.

(C) a scientific law.

(D) an observation.

**7** A photoelectric cell is a device that produces electricity when light strikes its surface. This electricity can be used to supply power for a spacecraft.




The graph shows that the amount of electricity produced by a spacecraft's photoelectric cell

(A) increases when its distance from the Sun increases.

(B) decreases when its distance from the Sun increases.

(C) decreases when its distance from the Sun decreases.

(D) increases when its distance from the Sun decreases.

**8** A hybrid red-eyed fly is crossed with a white-eyed fly. Red eyes ($R$) are dominant over white eyes ($r$). What are the possible genotypes for the offspring?

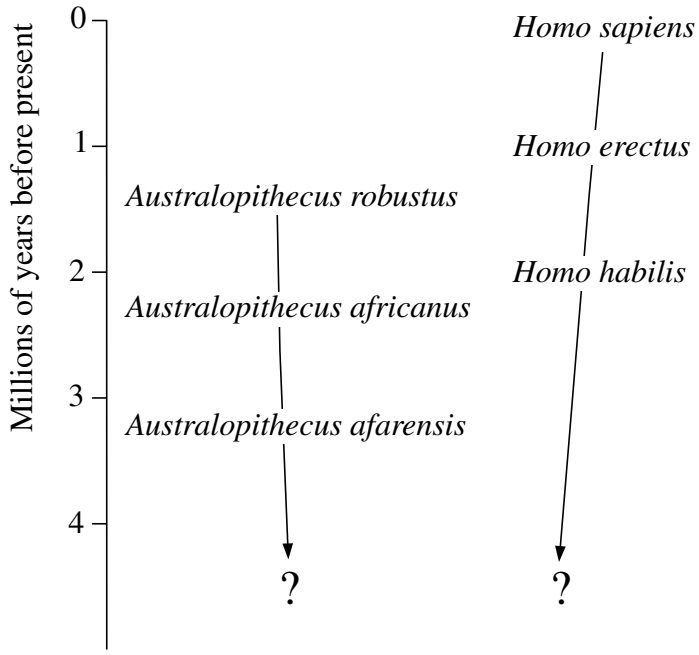
(A) *RR*, *Rr*, *rr*.

(B) *RR*, *rr*.

(C) *Rr*, *rr*.

(D) *Rr*.

**9** The time-line below represents one interpretation of the fossil evidence that can be used to describe human ancestry.




From this information it is correct to assume that

(A) *Homo habilis* lived about 2 million years ago.

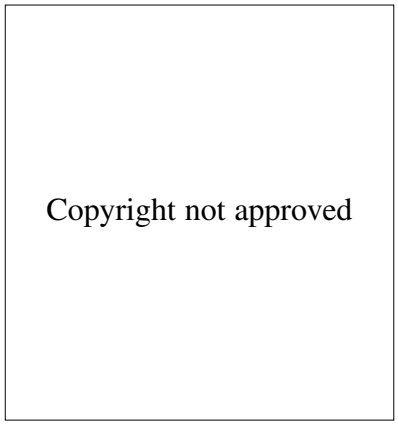
(B) *Australopithecus afarensis* is a species that is alive today.

(C) *Homo habilis* lived longer than *Australopithecus africanus*.

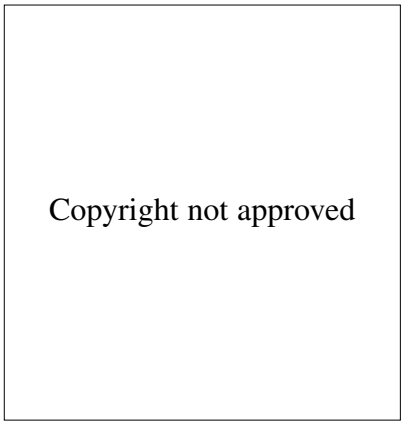
(D) *Australopithecus* and *Homo* groups must be related to a common ancestor.

**10** Which of the following statements about the primates shown below is correct?

*X*




*Y*



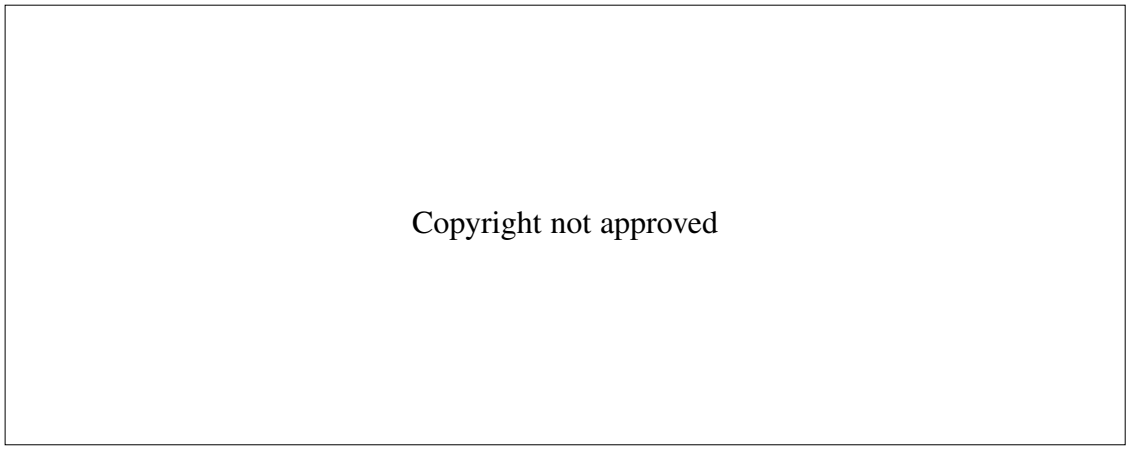

(A) *X* is a New World monkey because it has a prehensile tail.

(B) *Y* is a New World monkey because its limbs are of equal length.

(C) *X* is an Old World monkey because it has stereoscopic vision.

(D) *Y* is an Old World monkey because it has a thick mane of fur over its head and shoulders.

**11** The picture below shows four different primate hands.




HUMAN CHIMPANZEE GORILLA ORANG-UTAN

The main feature that allows us to classify these animals as primates is

(A) five digits on each hand.

(B) finger prints.

(C) nails/claws on each digit.

(D) opposable thumbs.

**12** Pesticides are compounds that can be used to kill organisms that are considered pests. One danger of overusing these compounds is that

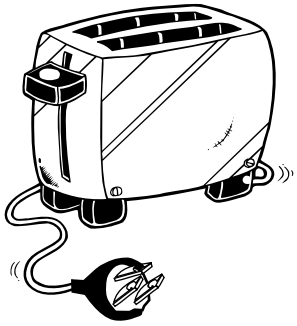
(A) they always break down easily in ultraviolet light, producing toxic substances.

(B) they never break down naturally and become concentrated in the food chain.

(C) an individual exposed to these compounds will become resistant.

(D) resistance develops because some individuals survive.

**13** What would be the best metal to use in the electrical cord illustrated below?



(A) Iron

(B) Copper

(C) Platinum

(D) Tin

**14** Glass is often preferred to metal for storing foods because glass

(A) is recyclable.

(B) is stronger than metal.

(C) is chemically unreactive.

(D) withstands changes in temperature better than metal.

**15** A clothes manufacturer wants to produce a new range of summer sportswear. She has a choice of four types of material to use.

| *Material* | *Characteristics* |
|---|---|
| *A* | Does not absorb moisture, poor conductor of heat. |
| *B* | Absorbs moisture, good conductor of heat. |
| *C* | Absorbs moisture, poor conductor of heat. |
| *D* | Does not absorb moisture, good conductor of heat. |

Based on the above characteristics, which material would be the best to use?

(A) *A*

(B) *B*

(C) *C*

(D) *D*

## PART B

Questions 16–25 are worth 3 marks each.

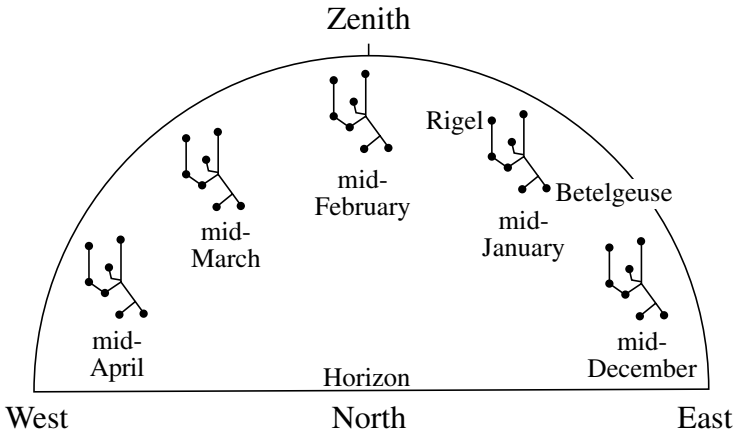
Answer this Part in the Part B Answer Book.

**16** Copernicus proposed an alternative to the model of our solar system developed by Ptolemy in the second century.

(a) Draw a simple labelled diagram to represent Ptolemy's model of the solar system.

(b) State ONE similarity and ONE difference between Ptolemy's and Copernicus' models.

**17**




ORION'S YEARLY PATH

*Earth's Neighbours in Space, Junior Secondary Science Project, Pearson Education Australia Pty Ltd, Melbourne, 1974*

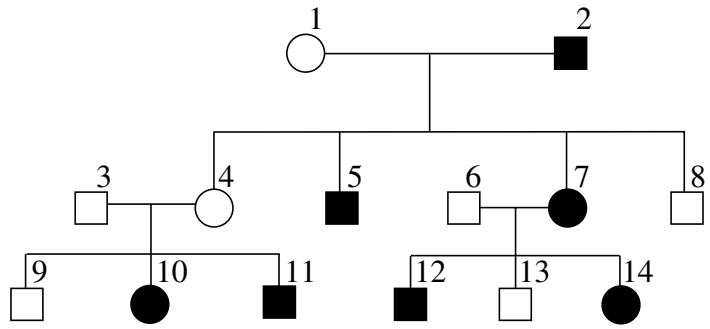
The constellation Orion moves across the night sky throughout the year. The diagram above shows Orion's position as seen from central New South Wales. Each position was recorded at 10.00 pm on the fifteenth of the month.

(a) Briefly explain why the constellation of Orion appears to change position in the night-time sky throughout this five-month period.

(b) Describe the approximate position of this constellation at 10.00 pm on the fifteenth of June.

(c) Suggest a reason why the stars Rigel and Betelgeuse are the brightest stars in this constellation.

**18** The following pedigree represents the inheritance of a disease.




KEY

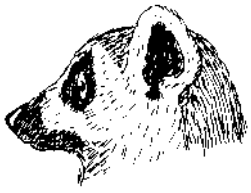
- Unaffected female
- Unaffected male
- Affected female
- Affected male

(a) Is the gene for the disease recessive or dominant?

(b) Using *B* to represent the dominant allele and *b* to represent the recessive allele, what is the genotype for individual 8?

(c) If number 12 were to marry an unaffected female without any history of the disease in her family, what is the chance of the couple having an affected child?

**19** Three primates are shown below.



Copyright not approved

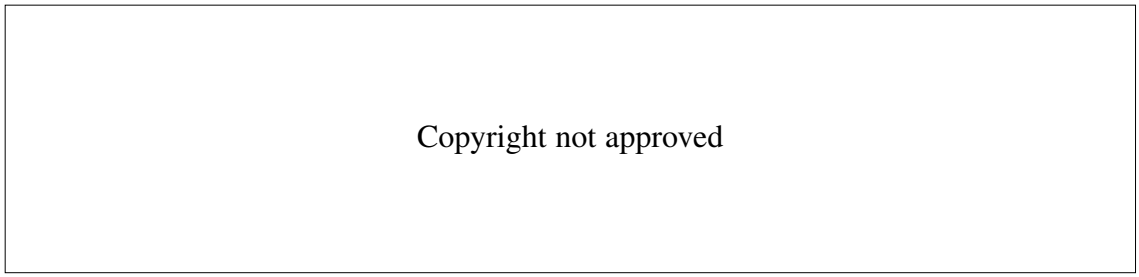
*A* *B* *C*

*Mudie, Kate, Core Biology, Heinemann Educational Australia, Port Melbourne, Vic, 1989*

(a) In which of these primates is the sense of smell most developed? Explain your answer using characteristics visible in the diagrams.

(b) Most primates have well-developed binocular vision. State the advantage of this characteristic.

**20** Illustrated below are four hominid skulls from different periods of time, drawn to the same scale.




*A* *B* *C* *D*

(a) Using the letters *A*, *B*, *C*, and *D*, place these skulls in correct order from most ancient to most recent.

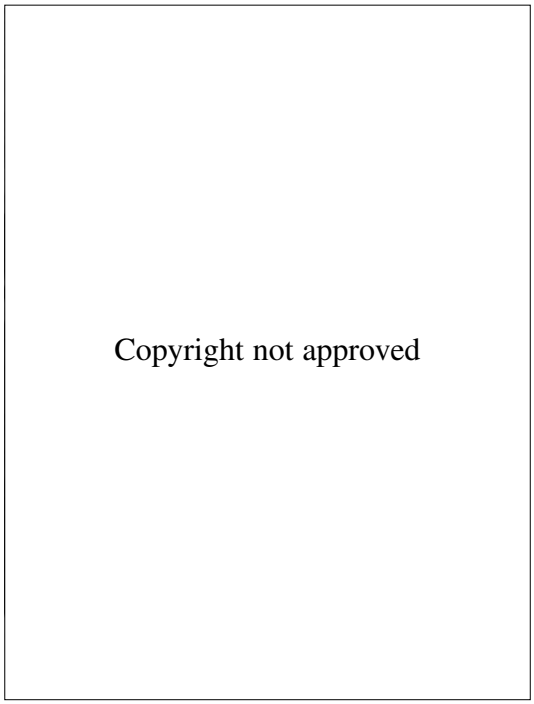
(b) Describe TWO characteristics of the skulls, visible in the diagrams, that allow you to put them in the correct order.

**21** After an accident in which Kim cut his foot, Kim was prescribed a course of antibiotics when the wound became inflamed. Kim was told that the full course of antibiotics must be consumed, even if the inflammation disappeared within forty-eight hours.

(a) What could happen to Kim if this advice was not followed?

(b) Explain the consequences of many people failing to complete their courses of antibiotics.

**22** The Poseidon nugget found in Australia in 1906 was one of the largest nuggets of pure gold ever discovered.




POSEIDON NUGGET

THE ACTIVITY OF METALS

| *Activity* | *Metal* |
|---|---|
| Most active | Sodium |
| ↓ | Calcium |
| ↓ | Magnesium |
| ↓ | Aluminium |
| ↓ | Zinc |
| ↓ | Chromium |
| ↓ | Iron |
| ↓ | Nickel |
| ↓ | Tin |
| ↓ | Lead |
| ↓ | Copper |
| ↓ | Mercury |
| ↓ | Silver |
| ↓ | Platinum |
| Least active | Gold |

(a) Why have large pieces of pure gold been discovered but not large pieces of aluminium or iron?

(b) How is the extraction of metals from their ores related to their position on the activity series shown above?

**23** During the past forty years there has been a significant increase in the number of synthetic materials. These are used in a number of industries, one of which is the textile industry.

(a) Name ONE natural fibre that is used in the manufacture of cloth.

(b) What is a synthetic alternative to this material?

(c) Explain ONE property of this alternative that makes it suitable for the manufacture of cloth.

**24** You have an idea that mice will perform a simple task more easily immediately after a meal.

Design an experiment to test this idea under the headings Hypothesis and Method.

**25** You have been asked to undertake an opinion poll in a local community to discover the extent to which the scientific basis of our present culture is appreciated.

(a) Describe ONE feature of your opinion poll that ensures it is:

(i) random;

(ii) relatively free of scientific bias.

(b) Name ONE scientific discovery, and explain how it has positively influenced Australian culture.

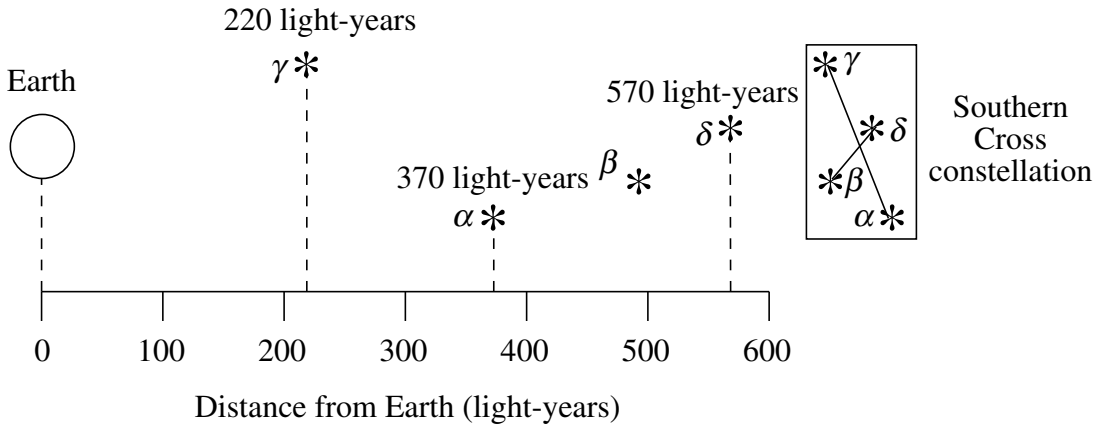
**Please turn over**

## PART C

Questions 26–31 are worth 5 marks each.

Answer this Part in the Part C Answer Book.

**26** The light-year is a unit used to measure distances in astronomy. A light-year is the distance travelled by light in one year. The graph below shows the distances from Earth to the four brightest stars seen in the Southern Cross constellation. The constellation as it appears from Earth is shown to the right of the graph.




*Stannard & Williamson, Science World 10, Macmillan, South Melbourne, 1995–1997, p 141*

(a) Which star is closest to Earth?

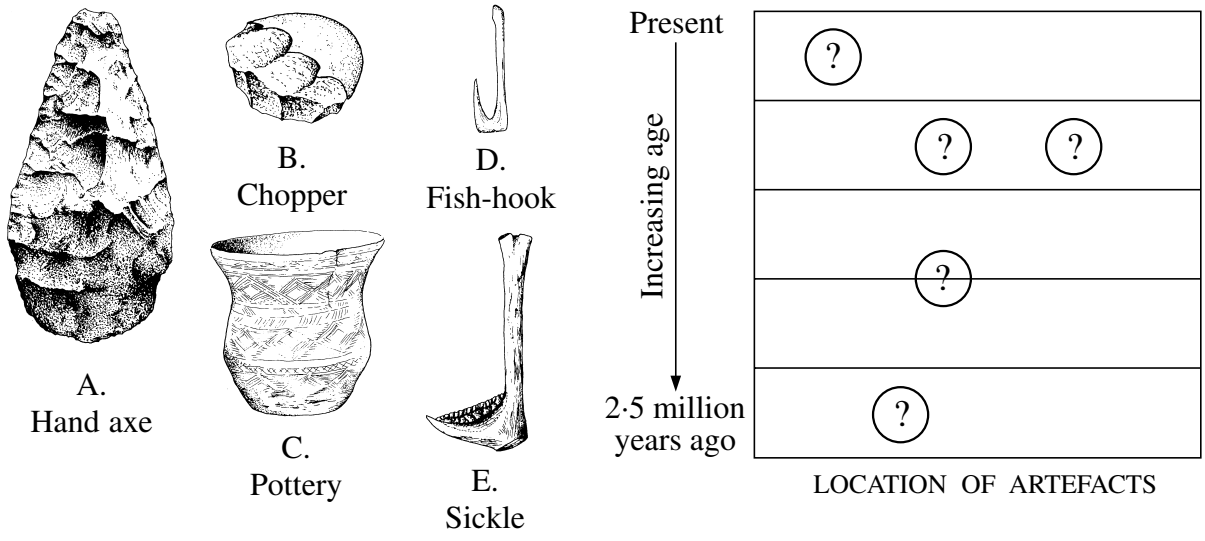
(b) How far from Earth is the star labelled $\beta$?

(c) How much longer would the light from $\delta$ take to reach Earth compared to the light from $\gamma$?

(d) If a space probe were to travel at half the speed of light, how long would it take to travel from the star labelled $\gamma$ to the star labelled $\alpha$?

(e) Why are distances to far-away stars measured in light-years and not in kilometres?

**27** Various artefacts have been unearthed by anthropologists at a site occupied by humans and human ancestors for 2·5 million years. Some of these are shown below. A profile of the dig at this site is also shown.




*Human Origins, Biozone International Ltd, © 1992*

(a) Name TWO materials that would have been used to make these artefacts.

(b) In your Part C Answer Book is a copy of the profile of the dig at this site. Write the letters A, B, C, D, and E in the circles on the profile at the depth you think each artefact would have been found.

(c) On which continent would this site be located? Explain your answer.

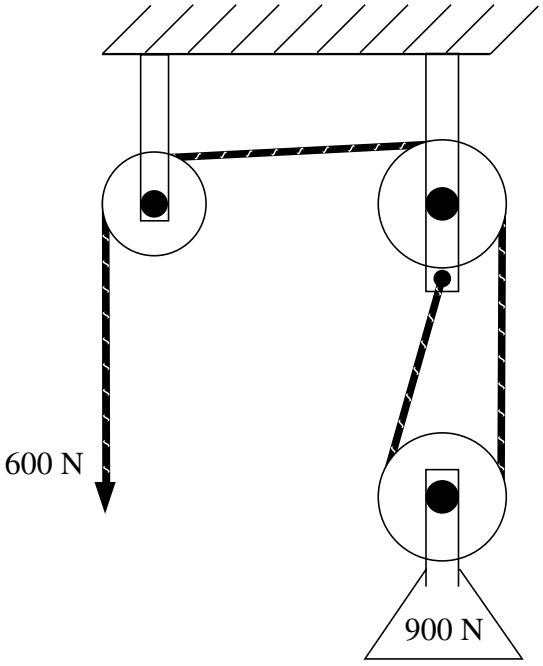
**28** State ONE recent space venture you have studied.

(a) What was its purpose?

(b) Describe TWO problems that related to this space venture.

(c) For each problem listed in part (b) above, how has science contributed to overcoming this problem?

**29** A pulley system as shown allows Chris to lift a 900 N load by exerting a force of 600 N. The load moves 10 cm if Chris pulls the rope 20 cm.

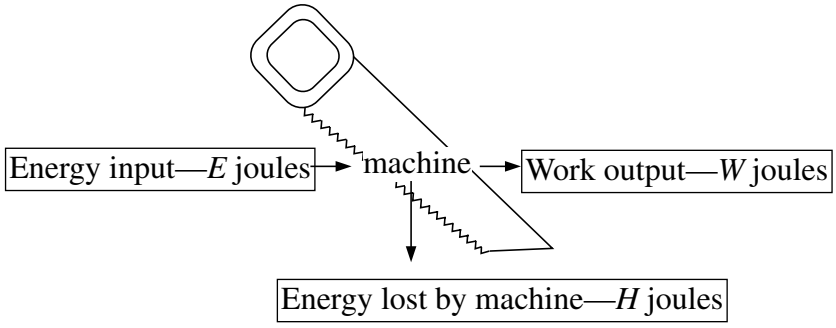



(a) Calculate the efficiency of the pulley system. Show all working.

(b) If a pulley system is less than 100% efficient, give TWO ways in which energy could be lost.

(c) Suggest a change in design that might improve the efficiency.

(d) The following diagram shows what occurs when a machine is doing work.




Write a simple equation showing the relationship between *E*, *H* and *W*.

**30** To control Australia's feral rabbit population, a disease called myxomatosis was introduced. At first it was very effective, killing over 90% of the rabbits. Numerous generations of rabbits later, their numbers began to increase again, soon regaining plague proportions.

(a) What characteristic in the rabbit population had changed?

(b) How would this change be explained by:

(i) Darwin?

(ii) Lamarck?

**31** Polymers are useful materials that have had a significant effect on our culture.

(a) Define the term *polymer*. Include a diagram as part of your answer.

(b) (i) Describe a procedure you followed to prepare a sample of a polymer or a glass.

(ii) State ONE safety precaution you need to take in using the procedure described above.

## SECTION II—ELECTIVES

(25 Marks)

Attempt ONE question.

Answer the question in a SEPARATE Elective Answer Book.

Write your Student Number and Centre Number on the cover of each Elective Answer Book.

Write the Course, Elective Name and Question Number on the cover of each Elective Answer Book.

**QUESTION 32 Colour** **Marks**

Read all parts of the question before commencing your answer. Note that your answer to part (c) must NOT include answers given in part (a) and part (b).

(a) Choose one investigation that you carried out in your study of Colour. **10**

For this investigation:

(i) describe what you were trying to find out;

(ii) describe the equipment used (include a labelled diagram, if appropriate);

(iii) explain the purpose of a control when used in scientific experiments;

(iv) describe your experimental control (if no control was used, explain why it was not necessary);

(v) summarise the results of your investigation;

(vi) state the conclusions you can draw from the results;

(vii) explain how the method you followed allowed you to draw these conclusions;

(viii) suggest ONE way in which your experimental design could be improved.

(b) In your study of Colour, you have used a number of scientific terms. **4**

(i) Explain the meaning of the TWO terms below:

1 trichromatism;

2 spectrometer.

(ii) List TWO other terms used in your study of Colour and explain what each term means.

(c) A community group has asked you to give a brief talk (approximately 10 minutes) about colour and living things. **9**

Without using the investigation in part (a) or any of the four terms in part (b) above, list the THREE main headings under which you would arrange your talk. Explain the concepts you would discuss under each heading. Be careful to ensure that the points are discussed in a logical order. Include at least THREE relevant diagrams, graphs, tables or flowcharts, that will assist in explaining the concepts. Do NOT write the whole talk out, but briefly explain each main concept.

(d) Explain how your study of Colour has increased your understanding of the relationship between science and society. **2**

**QUESTION 33 Metals in the Service of People** **Marks**

Read all parts of the question before commencing your answer. Note that your answer to part (c) must NOT include answers given in part (a) and part (b).

(a) Choose one investigation that you carried out in your study of Metals in the Service of People. **10**

For this investigation:

(i) describe what you were trying to find out;

(ii) describe the equipment used (include a labelled diagram, if appropriate);

(iii) explain the purpose of a control when used in scientific experiments;

(iv) describe your experimental control (if no control was used, explain why it was not necessary);

(v) summarise the results of your investigation;

(vi) state the conclusions you can draw from the results;

(vii) explain how the method you followed allowed you to draw these conclusions;

(viii) suggest ONE way in which your experimental design could be improved.

(b) In your study of Metals in the Service of People, you have used a number of scientific terms. **4**

(i) Explain the meaning of the TWO terms below:

1 ore;

2 malleable.

(ii) List TWO other terms used in your study of Metals in the Service of People and explain what each term means.

(c) A community group has asked you to give a brief talk (approximately 10 minutes) about modern methods of extraction of metals and reasons for the use of the different processes. **9**

Without using the investigation in part (a) or any of the four terms in part (b) above, list the THREE main headings under which you would arrange your talk. Explain the concepts you would discuss under each heading. Be careful to ensure that the points are discussed in a logical order. Include at least THREE relevant diagrams, graphs, tables or flowcharts, that will assist in explaining the concepts. Do NOT write the whole talk out, but briefly explain each main concept.

(d) Explain how your study of Metals in the Service of People has increased your understanding of the relationship between science and society. **2**

**QUESTION 34 Optics** **Marks**

Read all parts of the question before commencing your answer. Note that your answer to part (c) must NOT include answers given in part (a) and part (b).

(a) Choose one investigation that you carried out in your study of Optics. **10**

For this investigation:

(i) describe what you were trying to find out;

(ii) describe the equipment used (include a labelled diagram, if appropriate);

(iii) explain the purpose of a control when used in scientific experiments;

(iv) describe your experimental control (if no control was used, explain why it was not necessary);

(v) summarise the results of your investigation;

(vi) state the conclusions you can draw from the results;

(vii) explain how the method you followed allowed you to draw these conclusions;

(viii) suggest ONE way in which your experimental design could be improved.

(b) In your study of Optics, you have used a number of scientific terms. **4**

(i) Explain the meaning of the TWO terms below:

1 refraction;

2 convex lens.

(ii) List TWO other terms used in your study of Optics and explain what each term means.

(c) A community group has asked you to give a brief talk (approximately 10 minutes) about modern developments in optics. **9**

Without using the investigation in part (a) or any of the four terms in part (b) above, list the THREE main headings under which you would arrange your talk. Explain the concepts you would discuss under each heading. Be careful to ensure that the points are discussed in a logical order. Include at least THREE relevant diagrams, graphs, tables or flowcharts, that will assist in explaining the concepts. Do NOT write the whole talk out, but briefly explain each main concept.

(d) Explain how your study of Optics has increased your understanding of the relationship between science and society. **2**

**QUESTION 35 Petroleum and its Compounds** **Marks**

Read all parts of the question before commencing your answer. Note that your answer to part (c) must NOT include answers given in part (a) and part (b).

(a) Choose one investigation that you carried out in your study of Petroleum and its Compounds. **10**

For this investigation:

(i) describe what you were trying to find out;

(ii) describe the equipment used (include a labelled diagram, if appropriate);

(iii) explain the purpose of a control when used in scientific experiments;

(iv) describe your experimental control (if no control was used, explain why it was not necessary);

(v) summarise the results of your investigation;

(vi) state the conclusions you can draw from the results;

(vii) explain how the method you followed allowed you to draw these conclusions;

(viii) suggest ONE way in which your experimental design could be improved.

(b) In your study of Petroleum and its Compounds, you have used a number of scientific terms. **4**

(i) Explain the meaning of the TWO terms below:

1 fractional distillation;

2 crude oil.

(ii) List TWO other terms used in your study of Petroleum and its Compounds and explain what each term means.

(c) A community group has asked you to give a brief talk (approximately 10 minutes) about the formation of petroleum in the earth's crust. **9**

Without using the investigation in part (a) or any of the four terms in part (b) above, list the THREE main headings under which you would arrange your talk. Explain the concepts you would discuss under each heading. Be careful to ensure that the points are discussed in a logical order. Include at least THREE relevant diagrams, graphs, tables or flowcharts, that will assist in explaining the concepts. Do NOT write the whole talk out, but briefly explain each main concept.

(d) Explain how your study of Petroleum and its Compounds has increased your understanding of the relationship between science and society. **2**

**QUESTION 36 Physiology of the Senses** **Marks**

Read all parts of the question before commencing your answer. Note that your answer to part (c) must NOT include answers given in part (a) and part (b).

(a) Choose one investigation that you carried out in your study of Physiology of the Senses. **10**

For this investigation:

(i) describe what you were trying to find out;

(ii) describe the equipment used (include a labelled diagram, if appropriate);

(iii) explain the purpose of a control when used in scientific experiments;

(iv) describe your experimental control (if no control was used, explain why it was not necessary);

(v) summarise the results of your investigation;

(vi) state the conclusions you can draw from the results;

(vii) explain how the method you followed allowed you to draw these conclusions;

(viii) suggest ONE way in which your experimental design could be improved.

(b) In your study of Physiology of the Senses, you have used a number of scientific terms. **4**

(i) Explain the meaning of the TWO terms below:

1 neurone;

2 retina.

(ii) List TWO other terms used in your study of Physiology of the Senses and explain what each term means.

(c) A community group has asked you to give a brief talk (approximately 10 minutes) about malfunctions of ONE sense organ. **9**

Without using the investigation in part (a) or any of the four terms in part (b) above, list the THREE main headings under which you would arrange your talk. Explain the concepts you would discuss under each heading. Be careful to ensure that the points are discussed in a logical order. Include at least THREE relevant diagrams, graphs, tables or flowcharts, that will assist in explaining the concepts. Do NOT write the whole talk out, but briefly explain each main concept.

(d) Explain how your study of Physiology of the Senses has increased your understanding of the relationship between science and society. **2**

**QUESTION 37 Reproduction in Animals and Plants** **Marks**

Read all parts of the question before commencing your answer. Note that your answer to part (c) must NOT include answers given in part (a) and part (b).

(a) Choose one investigation that you carried out in your study of Reproduction in Animals and Plants. **10**

For this investigation:

(i) describe what you were trying to find out;

(ii) describe the equipment used (include a labelled diagram, if appropriate);

(iii) explain the purpose of a control when used in scientific experiments;

(iv) describe your experimental control (if no control was used, explain why it was not necessary);

(v) summarise the results of your investigation;

(vi) state the conclusions you can draw from the results;

(vii) explain how the method you followed allowed you to draw these conclusions;

(viii) suggest ONE way in which your experimental design could be improved.

(b) In your study of Reproduction in Animals and Plants, you have used a number of scientific terms. **4**

(i) Explain the meaning of the TWO terms below:

1 embryo;

2 meiosis.

(ii) List TWO other terms used in your study of Reproduction in Animals and Plants and explain what each term means.

(c) A community group has asked you to give a brief talk (approximately 10 minutes) about evolutionary trends in methods of reproduction. **9**

Without using the investigation in part (a) or any of the four terms in part (b) above, list the THREE main headings under which you would arrange your talk. Explain the concepts you would discuss under each heading. Be careful to ensure that the points are discussed in a logical order. Include at least THREE relevant diagrams, graphs, tables or flowcharts, that will assist in explaining the concepts. Do NOT write the whole talk out, but briefly explain each main concept.

(d) Explain how your study of Reproduction in Animals and Plants has increased your understanding of the relationship between science and society. **2**

**QUESTION 38 The Insects** **Marks**

Read all parts of the question before commencing your answer. Note that your answer to part (c) must NOT include answers given in part (a) and part (b).

(a) Choose one investigation that you carried out in your study of The Insects. **10**

For this investigation:

(i) describe what you were trying to find out;

(ii) describe the equipment used (include a labelled diagram, if appropriate);

(iii) explain the purpose of a control when used in scientific experiments;

(iv) describe your experimental control (if no control was used, explain why it was not necessary);

(v) summarise the results of your investigation;

(vi) state the conclusions you can draw from the results;

(vii) explain how the method you followed allowed you to draw these conclusions;

(viii) suggest ONE way in which your experimental design could be improved.

(b) In your study of The Insects, you have used a number of scientific terms. **4**

(i) Explain the meaning of the TWO terms below:

1 incomplete metamorphosis;

2 exoskeleton.

(ii) List TWO other terms used in your study of The Insects and explain what each term means.

(c) A community group has asked you to give a brief talk (approximately 10 minutes) about the biological success of insects. **9**

Without using the investigation in part (a) or any of the four terms in part (b) above, list the THREE main headings under which you would arrange your talk. Explain the concepts you would discuss under each heading. Be careful to ensure that the points are discussed in a logical order. Include at least THREE relevant diagrams, graphs, tables or flowcharts, that will assist in explaining the concepts. Do NOT write the whole talk out, but briefly explain each main concept.

(d) Explain how your study of The Insects has increased your understanding of the relationship between science and society. **2**

**QUESTION 39 The Science of Food Technology** **Marks**

Read all parts of the question before commencing your answer. Note that your answer to part (c) must NOT include answers given in part (a) and part (b).

(a) Choose one investigation that you carried out in your study of The Science of Food Technology. **10**

For this investigation:

(i) describe what you were trying to find out;

(ii) describe the equipment used (include a labelled diagram, if appropriate);

(iii) explain the purpose of a control when used in scientific experiments;

(iv) describe your experimental control (if no control was used, explain why it was not necessary);

(v) summarise the results of your investigation;

(vi) state the conclusions you can draw from the results;

(vii) explain how the method you followed allowed you to draw these conclusions;

(viii) suggest ONE way in which your experimental design could be improved.

(b) In your study of The Science of Food Technology, you have used a number of scientific terms. **4**

(i) Explain the meaning of the TWO terms below:

1 freeze drying;

2 denatured.

(ii) List TWO other terms used in your study of The Science of Food Technology and explain what each term means.

(c) A community group has asked you to give a brief talk (approximately 10 minutes) about scientific principles applied to food packaging. **9**

Without using the investigation in part (a) or any of the four terms in part (b) above, list the THREE main headings under which you would arrange your talk. Explain the concepts you would discuss under each heading. Be careful to ensure that the points are discussed in a logical order. Include at least THREE relevant diagrams, graphs, tables or flowcharts, that will assist in explaining the concepts. Do NOT write the whole talk out, but briefly explain each main concept.

(d) Explain how your study of The Science of Food Technology has increased your understanding of the relationship between science and society. **2**

**QUESTION 40 The Scientific Basis of Photography** **Marks**

Read all parts of the question before commencing your answer. Note that your answer to part (c) must NOT include answers given in part (a) and part (b).

(a) Choose one investigation that you carried out in your study of The Scientific Basis of Photography. **10**

For this investigation:

(i) describe what you were trying to find out;

(ii) describe the equipment used (include a labelled diagram, if appropriate);

(iii) explain the purpose of a control when used in scientific experiments;

(iv) describe your experimental control (if no control was used, explain why it was not necessary);

(v) summarise the results of your investigation;

(vi) state the conclusions you can draw from the results;

(vii) explain how the method you followed allowed you to draw these conclusions;

(viii) suggest ONE way in which your experimental design could be improved.

(b) In your study of The Scientific Basis of Photography, you have used a number of scientific terms. **4**

(i) Explain the meaning of the TWO terms below:

1 lens;

2 filter.

(ii) List TWO other terms used in your study of The Scientific Basis of Photography and explain what each term means.

(c) A community group has asked you to give a brief talk (approximately 10 minutes) about the chemical basis of the photographic process. **9**

Without using the investigation in part (a) or any of the four terms in part (b) above, list the THREE main headings under which you would arrange your talk. Explain the concepts you would discuss under each heading. Be careful to ensure that the points are discussed in a logical order. Include at least THREE relevant diagrams, graphs, tables or flowcharts, that will assist in explaining the concepts. Do NOT write the whole talk out, but briefly explain each main concept.

(d) Explain how your study of The Scientific Basis of Photography has increased your understanding of the relationship between science and society. **2**

**QUESTION 41 Water** **Marks**

Read all parts of the question before commencing your answer. Note that your answer to part (c) must NOT include answers given in part (a) and part (b).

(a) Choose one investigation that you carried out in your study of Water. **10**

For this investigation:

(i) describe what you were trying to find out;

(ii) describe the equipment used (include a labelled diagram, if appropriate);

(iii) explain the purpose of a control when used in scientific experiments;

(iv) describe your experimental control (if no control was used, explain why it was not necessary);

(v) summarise the results of your investigation;

(vi) state the conclusions you can draw from the results;

(vii) explain how the method you followed allowed you to draw these conclusions;

(viii) suggest ONE way in which your experimental design could be improved.

(b) In your study of Water, you have used a number of scientific terms. **4**

(i) Explain the meaning of the TWO terms below:

1 physical property;

2 water cycle.

(ii) List TWO other terms used in your study of Water and explain what each term means.

(c) A community group has asked you to give a brief talk (approximately 10 minutes) about problems associated with the shortage of water. **9**

Without using the investigation in part (a) or any of the four terms in part (b) above, list the THREE main headings under which you would arrange your talk. Explain the concepts you would discuss under each heading. Be careful to ensure that the points are discussed in a logical order. Include at least THREE relevant diagrams, graphs, tables or flowcharts, that will assist in explaining the concepts. Do NOT write the whole talk out, but briefly explain each main concept.

(d) Explain how your study of Water has increased your understanding of the relationship between science and society. **2**

**End of paper**