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**1997** HSC

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**EXAMINATION  
REPORT**

**General Science**

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**1997 Higher School Certificate  
Examination Report  
General Science**

**2 Unit**

In 1997, 2047 candidates presented for the examination in General Science compared with 2057 in 1996.

**General Comments**

As in previous years, there was a need for candidates to identify key words, eg *state, name, list, describe, explain*, which would enable them to interpret what was required to provide a full answer to the question. Where explanations or descriptions were required, expression was often poor and answers difficult to decipher. Although diagrams are often very useful when providing an explanation, candidates did not always use them. When they did so, the diagrams were often poorly drawn and not clearly labelled. Many candidates failed to score marks as they answered in generalities rather than providing succinct, specific statements.

**Section I Core****Part A****Multiple-choice questions**

The following table gives the percentage of the candidature correctly answering each question.

Mean = 9.60/15

Question	Correct Answer	Percentage Correct
1	B	65.78
2	C	24.75
3	C	18.44
4	D	85.95
5	D	45.17
6	B	93.93
7	C	40.48
8	B	68.74

Question	Correct Answer	Percentage Correct
9	A	77.42
10	B	51.04
11	D	77.02
12	A	86.74
13	D	79.24
14	A	53.40
15	B	92.16

For all questions, except Questions 2 and 3, the correct answer was chosen more frequently than any of the distracters..

For Questions 2, 3, 5 and 7, the correct answer was chosen by less than 50% of the candidature.

In Question 2 about half of the candidates believed that the phases of the moon were caused by the shadow of the Earth.

In Question 3, the more able candidates correctly identified Plato's contribution to astronomy. The rest of the responses were divided fairly evenly across the three distractors..

## Part B

Mean = 16.94/30

### Question 16

- (a) This part was well answered.
- (b) Many candidates were unable to provide a reason to show why forward pointing eyes are more suited to most primate lifestyles than eyes on the side of the head.
- (c) This part was well understood.

### Question 17

- (a) Many advances given as answers were not technological advances. A number of candidates did not specifically link the advance to an aspect of survival, they described, rather, how the advance made life easier. Others simply repeated the question as an answer.
- (b) Few candidates were able to give two aspects of culture common to both Cro-Magnon people and Modern Humans.

### Question 18

- (a)  
*and* These parts were reasonably well answered, although some candidates confused
- (b) blood type (phenotype) with allele pairs (genotype).
- (b) This was very poorly answered, with few candidates being able to give an adequate explanation why AB blood type is less common than either type A or type B blood.

### Question 19

- (a) Some candidates did not name the material to which their answers referred, even though this was asked for in the Answer Book. Some candidates confused *product* with *property*, others gave a property of a product derived from the material, eg *colourful* rather than *easily dyed*. Many confused *conductor of heat* with *insulator*.
- (b) Many candidates did not link the property stated in (a) with its use in modern society.
- (c) Most candidates were able to provide the name of a synthetic material that can be used as a suitable replacement.

### Question 20

On the whole this question was poorly answered.

- (a) Many candidates did not describe a problem as it related to space travel, but merely listed a key word, eg some simply stated *water* rather than identifying *the problem of recycling water*.
- (b)  
*and* In answers to these parts, candidates tended to *list* rather than to *describe* as was
- (c) asked for in the question.

### Question 21

- (a) Descriptions of the procedures used in carrying out the specific investigation tended to be marred by poor expression. Very few candidates used terms such as *azimuth* or *elevation* in their answers.
- (b) Many candidates interpreted the question as referring to the *phases* of the moon rather than to the moon's apparent movement. Few described the *apparent movement* as being from west to east.

### Question 22

- (a) A disappointingly large number of candidates named Lamarck as being one of the scientists who proposed the theory of natural selection.
- (b) The major weakness in the answers to this part of the question was that some candidates gave arguments that supported the theory rather than opposing it.

### Question 23

- (a) Most candidates chose to include a diagram to illustrate their answers. Unfortunately, many diagrams were of very poor quality and were unlabelled.

- (b) A number of candidates confused the *efficiency of the machine* with *mechanical advantage*. The concepts of efficiency, work and energy were poorly understood.

### Question 24

Candidates described a wide variety of experiments suitable to be used in testing the theory of natural selection. Experiments involving *Drosophila* had obviously been carried out by some candidates who were able to apply their knowledge in answering this question. Many, however, gave answers that were too general or were very poorly expressed, while some indicated confusion between the theories of Darwin and Lamarck..

### Question 25

- (a) Most candidates identified sand as a major raw material used in glass-making. Few were able to provide details of other materials used.
- (b) This was generally well answered, although some of the methods described could not really have been carried out in the school laboratory.
- (c) This part was also well answered, with candidates successfully describing a range of safety precautions.

## Part C

Mean = 17.53/30

### Question 26

- (a) The majority of candidates correctly answered this part of the question.
- (b) Most candidates were able to interpret correctly the two models shown in the question.
- (c) To gain the mark here, candidates needed to link the tools to the fossils of *Homo erectus*.. A significant number failed to describe this link.
- (d) This part of the question was well answered.

### Question 27

- (a) A significant number of candidates gave answers focussed on galaxies and the universe, rather than on the solar system as required in the question. It is stressed that candidates must answer the question asked.

In part (b), candidates tended to repeat one of their answers to part (a) rather than describing how the discovery extended our understanding of the solar system.

### Question 28

Part (b) of this question was better answered than part (a). In part (a) candidates had difficulty linking Oppenheimer's role with accountability.

In part (b), most candidates were able to name a scientific discovery and to describe both helpful and harmful effects of this discovery. A small number of candidates discussed issues that may be harmful/helpful in the future.

### Question 29

Most candidates answered this question well, although a disappointingly large number gave answers to part (c) relating to the development of *super bugs* in Lamarckian terms.

### Question 30

This question presented few problems for able candidates. Poorer responses for part (c) tended to be very general, with candidates confusing terms such as *strength*, *brittleness*, *hardness* and *durability*. Some candidates did not relate the property in c (ii) to the use given in c (i).

### Question 31

- (a) This part of the question was very well answered.
- (b) This part was much more poorly handled by candidates. Few could provide a difference or a similarity between the two models. Others could describe a difference, but attributed the model to the wrong astronomer. Candidates need to be able to distinguish between the *solar system* and the *universe*, and between *epicycles* and *ellipses*.

## SECTION II ELECTIVES

The following table gives the number and approximate percentage of candidates attempting each Elective.

	Elective	Number of candidates	Approx. %
Q 32	Colour	133	6.6
Q 33	Metals in the Service of People	133	6.6
Q 34	Optics	275	13.6
Q 35	Petroleum and its Compounds	110	5.4
Q 36	Physiology of the Senses	179	8.8
Q 37	Reproduction in Animals and Plants	180	8.9
Q 38	The Insects	105	5.2
Q 39	The Science of Food Technology	239	11.8
Q 40	The Scientific Basis of Photography	213	10.5
Q 41	Water	433	21.4

### General Comments

The majority of candidates were well prepared and responded to the questions with detailed answers. The more able candidates gave responses that were both succinct and accurate. These responses also showed that the candidates had studied their chosen elective in depth. A number of responses were, however, unnecessarily long.

Some candidates presented detailed, prepared answers which did not address the question. Again, it is stressed that it is important for candidates to read each question carefully and to focus their answers on the question set.

A common set of marking guidelines was developed for all of the electives. Each candidate's elective paper was then independently marked by two markers.

The following comments apply to all the electives, but where appropriate, specific references to elements of particular electives have been included.

#### Part (a) 7 marks

This part was done very well by able candidates in all the electives. The more able candidates, who had a good understanding of the experiment they were describing, supported their answers with appropriately labelled diagrams.

To gain full marks candidates were required to provide details of an experiment relevant to their chosen topic. Their answers should have included a heading, aim or purpose, equipment list or diagram, details of how the equipment is assembled or used, what is being measured or observed,



and a clear sequence of steps that would allow the experiment to be repeated

The following weaknesses were evident in poorer responses:

A significant number of candidates chose a topic and wrote about it at length, rather than using it as a heading. Where the topic had two parts, eg *sexual and asexual reproduction*, many candidates gave an experiment for both, although a description of only one experiment was required.

A number of candidates did not describe an experiment but instead described a procedure eg, developing a film. Some of the experiments described were trivial and lacked evidence of an in-depth study of the elective, eg, finding the boiling point of water.

A significant number of responses were of limited relevance to the topic chosen. Even though it was not appropriate, many candidates used the structure from part (c) as the basis for their answer to part (a).

A number of responses did not provide sufficiently detailed information to enable the experiment to be repeated by another student.

#### **Part (b) 5 marks**

Of the terms given in the examination paper, most were reasonably well explained. The terms *aperture*, *freeze drying*, *osmosis*, and *weathering* were, however, very poorly understood.

Most candidates could recall two other terms relevant to the study of their elective, but had only a poor understanding of their meaning. Many of the better candidates included diagrams to assist in their explanations.

To gain full marks candidates had to provide definitions of the two terms listed as well as of two other *relevant* terms used in their study.

#### **Part (c) 7 marks**

In each of the electives, most candidates answered the question by following the structure given in the paper. The better candidates also included a description of the procedure they had carried out. There was reasonable understanding of the need for controls and repetition, but many of the problems described were trivial. Again, as in part (a), there was some confusion between *investigation* and *procedure*. Many candidates gave their experimental results clearly in tables or diagrammatic form.

Although, contrary to the directions given in the question, a small but significant number used the same investigation as they had in part (a), responses in part (c) were generally of a higher standard to those given in part (a).

To gain full marks, candidates had to answer the question by referring to a relevant investigation that was different from that given in part (a). Their answers should also have included a statement of purpose, a description of equipment used, a description of what was done to make the results reliable (eg evidence of repetition of the investigation, description of controls), a description of a potential or encountered problem, and a clear description of the results obtained.

**Part (d)** 6 marks

Responses here indicated that a significant number of candidates were well prepared and were able to give detailed and elaborate answers that included diagrams where appropriate.

A small number of candidates gave well presented responses that did not answer the question. To gain full marks, however, all the items dealt with by the candidate had to be correct and relevant to the question.

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