

ADDITIONAL COMBINED SCIENCE

GCE Ordinary Level

Paper 5130/01 Multiple Choice
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<i>Question Number</i>	<i>Key</i>	<i>Question Number</i>	<i>Key</i>
1	A	21	A
2	C	22	A
3	A	23	D
4	C	24	C
5	D	25	C
6	D	26	B
7	B	27	B
8	A	28	A
9	B	29	D
10	D	30	C
11	C	31	B
12	C	32	B
13	A	33	D
14	C	34	B
15	B	35	C
16	D	36	A
17	D	37	A
18	B	38	D
19	C	39	A
20	A	40	C

Paper 5130/02 Theory

General comments

There was wide range in the knowledge and understanding of science shown by candidates. Able candidates showed a good grasp of most parts of the syllabus, but many showed only a superficial knowledge and could not fully understand or respond to the questions. All candidates performed better in **Section A**, where they were guided by detailed structuring of the questions, than in **Section B**, where the freedom given to frame their own answers often led to confusion. Weak candidates often gave long answers full of irrelevant detail. Although the general standard of written English was good, it was clear that some candidates did not understand the requirements of many of the questions. Only a small number of candidates did not answer an alternative for all three of the questions in **Section B**.

Comments on specific questions

Section A

Question 1

This question was answered well by the more able candidates. Less able candidates did not realise in part **(a)(i)** that tube F was a control, and described the mass lost in parts **(b)** and **(c)**, rather than suggesting what the results show or offering explanations. In part **(c)(ii)** a few candidates incorrectly wrote about photosynthesis or respiration instead of evaporation or transpiration.

Question 2

Most candidates scored well in part **(a)**. Some less able candidates mixed up ideas of atoms, molecules, elements and compounds. In part **(b)(ii)** only the more able scored well. Many candidates incorrectly thought that the bonding is covalent rather than ionic, and that the formula is MgO_2 rather than MgO .

Question 3

Only the better candidates could identify the waves from the electromagnetic spectrum in parts **(a)** and **(b)**, though most candidates scored well in part **(c)**.

Question 4

This question was answered poorly by most candidates. Few had any idea of the names or functions of parts of the reflex arc.

Question 5

- (a)(i)** Most candidates knew that the gas evolved is oxygen, although hydrogen was a common incorrect response.
- (ii)** This part was often missed from the diagram. Few candidates who attempted this placed the line in the correct place, i.e. showing half of the volume shown for hydrogen.
- (b)** Very few candidates had any idea of the ionic equation.
- $$2\text{H}^+(\text{aq}) + 2\text{e}^- \rightarrow \text{H}_2(\text{g}).$$
- (c)** Many candidates knew that an alkali is produced, although acid was a common incorrect answer. Few candidates could name the alkali correctly as sodium hydroxide. Sodium chloride was a common incorrect answer.

Question 6

- (a)(i)** Few candidates showed any knowledge of background radiation in answer to this part.
- (b)** Most candidates plotted the points correctly, although a few of the weaker candidates plotted the uncorrected counts per minute. Only the more able could draw a line of best fit. Many candidates simply joined up the individual points with straight lines.
- (c)** Surprisingly few candidates could read off the correct value from their graph.
- (d)** More able candidates gave sensible suggestions, but many quoted ways to ensure accuracy of measurement rather than safety. Vague references to not touching the source or wearing protective clothing did not score.

Question 7

- (a)(i)** Most candidates realised that the temperature in C was higher than that in B, and so gained one mark for this part. Few candidates related this higher temperature to a higher rate of reaction. Some gained a mark for mention of optimum temperature.

- (ii) The majority of candidates realised that the temperature was too high, but only the more able knew that this would denature the enzyme.
- (iii) Only the more able candidates knew the action of bile salts.
- (b) Many candidates knew that bile salts are produced by the liver. The most common incorrect answer was gall bladder.

Question 8

- (a) More able candidates were familiar with the limewater test for carbon dioxide and gained both marks here. Incorrect answers commonly referred to a lighted splint being extinguished. Many less able candidates had little idea of a test for the gas.
- (b) This part was very badly answered by even the more able candidates. Few had any idea of how to perform this calculation.

2mols octane produces 16 moles carbon dioxide;
2 x (96 + 18) = 228g octane produces 16 x 24 = 384 dm³ carbon dioxide;
1000g octane produces 384 x 1000/228 = 1684 dm³.
- (c)(i) Many candidates gave sulphur dioxide as the answer, instead of the correct answer carbon monoxide.
- (ii) Those who did give the correct gas generally knew something of its poisonous nature, although only the more able candidates could describe its effect on haemoglobin.
- (iii) More able candidates also gave sensible suggestions such as sulphur dioxide or lead compounds in this part. Many of the weaker candidates incorrectly answered carbon monoxide.

Question 9

- (a) Only the more able candidates could perform the calculation required.

(Vp/Vs = Np/Ns)
18/6 = Np/48
Np = 48 x 18/6
= 144

Common errors involved incorrect substitution of figures into the equation.
- (b) Only the more able candidates knew that heat is released or that resistance has to be overcome. Most candidates gave vague answers referring to losses in the wire or from the lamp.
- (c) Only a few candidates knew that the iron core is easily magnetised and demagnetised, and even fewer knew that in an a.c. power supply, the current is continually reversed.

Section B

Question 10

- (a) Most candidates showed a poor knowledge of respiration and gaseous exchange. Very few could relate an increase in breathing rate to an increase in the use of aerobic respiration in muscles, with a resulting need for more oxygen; or a shortage of oxygen supply leading to anaerobic respiration with consequent production of lactic acid. Many answers were vague and rambling. More candidates knew that sweating results in cooling, but few could relate this to the reason for excess heat being produced.
- (b) Many candidates knew the functions of red blood cells and root hair cells, but fewer related these to the way in which these cells are specialised. Weaker candidates gave vague answers that made little attempt to answer the question. Very few candidates knew how gametes are different from other cells. Only the most able referred to numbers of chromosomes. Differences between male and female gametes were better known, although some weak candidates confused this question with differences between male and female sex organs.

Question 11

- (a) Many candidates knew that a redox reaction involves reduction and oxidation and could give an example of a redox reaction. Few attempted to use this reaction to explain their definition. Many candidates restricted their definition to gain or loss of oxygen, and did not mention gain or loss of electrons. The difference between exothermic and endothermic reactions was better known, but ideas of energy changes in bond making and breaking were often confused. Many candidates incorrectly thought that bonds were broken only in endothermic reactions and made only in exothermic reactions, or vice versa.
- (b) This was not a popular question, and of those who attempted it few candidates showed any detailed knowledge of these polymers. Many scored marks for uses only. Even the most able candidates had little idea of the ester bonds in both *Terylene* and fats.

Question 12

- (a) Many candidates concentrated on results and did not give a full description of how they would carry out this investigation. More able candidates could sketch a graph of load vs extension, but few of these marked on it the limit of proportionality. Graphs that curved in the wrong direction, beyond the limit of proportionality were common. Many candidates incorrectly thought that the spring would not stretch any further beyond this point.
- (b) Very few candidates appreciated the idea of energy transfer. Many gave long answers detailing what happens in each part of the power station, but not stating the energy transfer at each location, and so scored no marks. Very few candidates could define the term efficiency. Even the most able candidates did not use the correct formula for the calculation in part (ii).

$$E = mc^2$$
$$E = 0.0321 \times 10^{-27} \times (3.00 \times 10^8)^2$$
$$E = 0.289 \times 10^{-11} \text{J}.$$