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Paper 5129/01
Multiple Choice

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

General comments

No question proved to be very easy with only **Question 13** very difficult. **Question's 6, 9, 10** and **11** were difficult with widespread guessing evident, even among the better candidates.

Comments on specific questions (Physics)

Question 1, 3, 4 and **5** covered areas of the syllabus well known by candidates with each correct option (**D**, **C**, **C** and **D** respectively) attracting more than 70 % of responses. In **Question 1** some more able candidates chose a distractor in option **C**. The most popular incorrect response in **Question 3** was option **A** and in **Question 4** and **5** it was option **B**.

Question 2

This showed good discrimination with more able candidates correctly choosing option **A** and the majority of the less able option **C**.

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Question 6

Convection as a result of density changes was not well known and resulted in widespread guessing among candidates, including the more able. Each option attracted an almost equal number of responses with some more able candidates electing for options **A** and **C**.

Question 7

This question discriminated well with option **A** the most popular of the incorrect options.

Question 8

This was well answered with 62 % of candidates choosing option **A** correctly. The remainder chose options evenly spread over the distractors.

Question 9

There was uncertainty among candidates, with more choosing the distractor option **A** than the key, option **D**. Option **B** attracted a significant response from more able candidates.

Question 10

The current in a simple series circuit with a parallel arrangement was not well known and resulted in widespread guessing from candidates with almost equal numbers choosing each option.

Question 11

The correct choice of fuse, option **B**, was understood by 25 % of candidates. Over 50 % favoured option **A**, a value just below the working current.

Question 12

This was well known and showed good discrimination. The less able candidates chose option **A**.

Question 13

Distinguishing between the relative ionising abilities of the radiations was beyond most candidates. A minority correctly chose option **A**. Most of the remaining candidates were almost equally divided between options **B** and **C**. Many of the more able candidates chose option **D**.

Comments on specific questions (Chemistry)

Question 14

The responses to this question indicate that there is a lack of understanding of the criteria for purity. Over 60 % of the candidates chose options **B** and **C**. A quarter of the candidates recognised that a pure substance boils at a fixed temperature and chose option **D**.

Question 15

Over half of the candidates, including a large proportion of the more able candidates, chose option **B**, a hydrogen ion, which consists of a proton. The particle which has the smallest mass of those offered is **A**, electron.

Question 16

There was evidence of guesswork particularly amongst the weaker candidates.

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Question 17

This proved to be challenging for the majority of the candidates. Candidates should be aware that one line in the structure of a covalent molecule represents a shared pair of electrons.

Question 18

There was evidence of guesswork amongst many of the candidates. Some of the more able candidates correctly took into account the proportions of the reactants given in the stem of the question but many candidates simply added the masses of the reactants together and chose option **D**.

Question 19

A third of the candidates correctly identified the hydrogen ion as the cause of acidity. A large number of candidates chose option **B**, the chloride ion.

Question 20

There was evidence of guesswork amongst the weaker candidates. Candidates who did not know the trend in melting points of the alkali metals incorrectly chose option **C**.

Question 21

Almost 50 % of the candidates thought that zinc is higher in the reactivity series than aluminium and chose option **D**. The presence of a protective oxide layer on the surface of aluminium was not well known.

Question 22

This proved to be an easy question for the more able candidates.

Question 23

Candidates who selected the correct answer were aware that nitrogen oxide is produced when a hydrocarbon fuel is burned in an internal combustion engine.

Question 24

The conditions for the Haber process are well known by many of the candidates.

Question 25

This question proved difficult for the majority of the candidates. Almost 50 % of the candidates chose option **B** where the more massive alkane was incorrectly described as having a lower boiling point.

Question 26

Many of the more able candidates were aware that the test for an alkene is the decolourisation of bromine water and were able to recognise the alkenes as those molecules with a carbon to carbon double bond.

Question 27

Many of the more able candidates correctly identified the molecular formula of ethanol but a significant proportion of the candidates chose option **A**.

Comments on specific questions (Biology)

Question 28

It was pleasing to see that most candidates were able to identify the plant cell structures in a photomicrograph, rather than in the usual diagram.

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Question 29

This question (on osmosis) discriminated well.

Question 30

Candidates had difficulty in interpreting the graph in this question. The most popular answer was to identify midnight as the time of maximum (rather than minimum) oxygen production.

Question 31-33

These were straightforward questions testing factual recall.

Question 34

In this respirometer experiment, most candidates knew that the indicator fluid will move towards the seeds, but there was confusion as to whether the seeds were absorbing oxygen or carbon dioxide.

Question 35

The commonest error was to opt for the pathway for oxygen, rather than carbon dioxide diffusion: perhaps the candidates did not read the question carefully enough.

Question 36

Most candidates were unclear about the action of the muscles in the iris.

Question 37-38

These questions worked well in discriminating between candidates.

Question 39

As last year, many candidates are unaware that the cotyledons are part of the embryo in a seed.

Question 40

This question, on breastfeeding, was well-answered.

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Paper 5129/02

Theory

Key Messages

Candidates should read the questions carefully to ensure that they are answering the questions asked. Candidates should be guided by the number of marks allocated to each question as to the length of the answer required.

General comments

The Examiners were pleased by the responses of the candidates in the Physics calculations, which showed an improvement on previous examinations. Questions involving atomic structure were particularly well answered by the candidates. Candidates did encounter difficulties in questions which involved descriptions of experiments and the handling of data. This was particularly noticeable in the Biology sections of the paper. The structure of the Periodic Table and the trends of the elements in the table were not well known.

Comments on specific questions

Question 1

(a)

(i) This was an easy question for the majority of the candidates.

(ii) The vast majority of the candidates were able to correctly identify the fuse.

(b) The colour of the neutral wire was less well known than **A** and **B** but nevertheless the question was well answered.

Question 2

(a) The two substances absorbed by the cell were quite well known by many of the candidates. The majority of the candidates identified water as one of the substances but minerals or mineral salts was less well known.

(b)

(i) A large number of the candidates simply described the shape of the cell shown in the diagram rather than explaining how the shape of the cell allows efficient absorption of the substances. Candidates were expected to recognise the significance of the large surface area of the cell.

(ii) The majority of the candidates gave a description of the absorption of the substances through the cell wall without stating that this occurs because of the semi-permeable nature of the cell wall or the fact that the cell wall is thin.

(c) The cell membrane was correctly identified by many candidates as the part of the cell that controls the movement of substances in and out of the cytoplasm. A significant number of candidates thought that the nucleus controlled the movement of the substances.

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Question 3

(a) Of the four elements only **Y** was placed correctly by a majority of the candidates. **W** and **Z** were less frequently correct despite the fact that **W** was stated as being a halogen. Candidates did not identify Group VII on the Periodic Table grid. Only the most able candidates identified **X** as an alkali metal but many of these candidates were unaware of the trends in melting points of the Group I metals.

(b) The ionic nature of the compound **XW** was recognised by a good proportion of the candidates.

Question 4

(a) The concept of half-life is not well understood by the majority of the candidates.

(b) This question was well done with the majority of candidates able to calculate the number of protons and neutrons in the nucleus of plutonium.

(c) Most candidates were unable to state the nature of an alpha particle. Candidates should be aware that an alpha particle consists of a helium **nucleus** and not a helium **atom**.

(d) The positive nature of both the nucleus and an alpha particle was not well known by the majority of the candidates and therefore they were unable to state that like charges repel.

Question 5

(a) The more able candidates calculated the proportions of the substances from the equation. A majority of the candidates were able to calculate the relative molecular mass of magnesium oxide however the relative molecular mass of water was less frequently correct with candidates not taking the two into account in the formula of water.

(b) Many candidates recognised that magnesium reacts with hydrochloric acid to produce magnesium chloride; the other possible reactants, magnesium hydroxide and magnesium carbonate were less well known. Some candidates misunderstood the question and gave the two substances as magnesium and chlorine.

Question 6

(a) The candidates' responses were frequently a description of the diagrams in the question rather than the starch content of each of the plates. Some candidates gained some credit for stating that the starch content in plate **B** is greater than the starch content in plate **A**. Few candidates made reference to the fact that starch is not present around the soaked seeds.

(b) The name of the enzyme was not well known by the candidates.

(c)

(i) A large number of candidates thought that glucose is produced from starch rather than maltose.

(ii) A significant proportion of the candidates were aware that the substance produced from starch by the action of amylase is needed by the seed for growth or as a source of energy.

Question 7

This question was well done by a large number of the candidates. Many candidates knew that the heart pumps the blood round the circulatory system, that the soluble food substance is glucose and the waste product is urea, however the valves and the veins were often reversed.

Question 8

(a) The vast majority of the candidates found this question easy.

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(b) Many candidates were able to calculate the resistance of the lamp but the units of resistance were less well known. Those candidates who calculated the value of the resistance incorrectly did gain credit for a correct unit.

Question 9

(a) Many candidates were able to correctly identify gas **A** and brown liquid **D**. Process **C** was less well known as polymerisation. Those candidates who simply gave the generic term 'alcohol' for liquid **B** were not given credit as the correct name for liquid **B** is ethanol.

(b) The more able candidates had no difficulty balancing the equation for the combustion of ethene.

(c) The vast majority of the candidates were unable to give a suitable use for poly(ethene). The expected answer was for making plastic bags.

Question 10

(a)

(i) Many candidates explained the causal relationship between HIV and heroin use rather than use the data to answer the question. Candidates were expected to compare the two bar charts and state that the pattern shown for one of the towns **A**, **B** or **C** indicated that when percentage of heroin users is high then the percentage of HIV infection is also high.

(ii) In a similar way candidates were expected to state that in towns **D** and **E** there is no direct link between the percentage of heroin users and the percentage of HIV Infection.

(b) A large number of the candidates were aware that heroin users could be infected by HIV because they share needles but only a small number of candidates went on to explain that this was because of the possibility of transfer of body fluid or blood.

(c) Candidates were expected to state a specific problem associated with heroin abuse such as increased crime, addiction, withdrawal symptoms or depression rather than a vague statement about family problems or the risk of death.

Question 11

The energy conversions were well known by a large number of candidates.

Question 12

Many candidates were able to calculate the force applied to the spanner. A number of candidates used the equation force = mass x acceleration rather than the equation force = moment / distance.

Question 13

(a) The definition of an isotope was well known.

(b) This question was exceptionally well done by the vast majority of the candidates.

(c) The acidic nature of the oxides of nitrogen was not well known by the candidates.

Question 14

(a) Many of the candidates did not identify the coil attached to the mains supply. A significant proportion of the candidates stated the name of the metal, copper, used for the coil.

(b) The name of the metal used to make the core was quite well known by the candidates.

(c) This question proved difficult for the majority of the candidates. Most candidates simply stated the purpose of a transformer rather than explain how it works. Candidates were expected to state that alternating current is supplied to the primary coil producing a changing magnetic field in the core which then induces an e.m.f. in the secondary coil.

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Question 15

(a) The candidates' responses indicate that there is some confusion between mammalian anaerobic respiration and microbial anaerobic respiration. A large proportion of the candidates found this question difficult and did not know that lactic acid is the only product of anaerobic respiration.

(b) Many candidates were able to state that anaerobic respiration occurs during exercise. The fact that this occurs due to the lack of oxygen in the cells was less well known. Some candidates stated that anaerobic respiration leads to cramp but this is a consequence of the respiration rather than an explanation as to why it occurs.

(c) The differences between aerobic and anaerobic respiration in humans are not well known. Candidates were expected to state that aerobic respiration occurs in the presence of oxygen and produces carbon dioxide, water and more energy.

Question 16

This question was well done by many of the candidates.

Question 17

(a) The vast majority of the candidates were able to complete the food chain correctly.

(b) The majority of the candidates were able to identify both the producer and a carnivore on the food web.

(c) The source of the energy for the food web was less well known. Candidates were expected to state that the source of energy was the Sun and not sunlight.

(d) The explanation of the term non-cyclical was not well done. Many candidates attempted to explain in general the meaning of the term rather than in the context of the question. Candidates were expected to state that energy is lost at each stage of the food chain and cannot be reused in the ecosystem.

Question 18

(a) Many candidates focused on the different uses of the two thermometers rather than the physical differences between them. A clinical thermometer differs from a laboratory thermometer in that it ether has a smaller range or has a constriction or retains the reading or is more sensitive or has a narrow bore.

(b)

(i) The increase in volume of the liquid inside a thermometer was quite well known by the candidates.

(ii) The decrease in the density of the liquid in the thermometer was less well known with many candidates stating that the density did not change with temperature

Question 19

(a) The definition of acceleration was not well known. The vast majority of the candidates answered the question in terms of speed rather than velocity. There is confusion amongst the candidates about the difference between speed and velocity.

(b) The calculation of the mass of the car was well done by the majority of the candidates. Some of the candidates had difficulty in manipulating the equation $F = ma$ in order to calculate the mass, however these candidates did gain credit for knowing the equation if it was stated in their answer.

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Question 20

(a)

(i) Haematite was not well known by many of the candidates.

(ii) The better candidates were able to use the reactivity series to explain why iron is extracted from its ore by heating with carbon, however many candidates answered the question by stating a metallic property such as thermal conductor.

(iii) The fact that stainless steel is prevented from rusting because it is an alloy was not well known. Many candidates thought that the protection was due to some sort of coating on the iron such as galvanising.

(b) A large proportion of the candidates were able to identify copper as the metal that does not react with hydrochloric acid. It was disappointing to see carbon, a non-metal, stated as an answer to this question.

Question 21

(a) It was not clear from a number of the candidates' responses which line was meant to be the normal. Candidates should be encouraged to label the rays on a ray diagram in order to make their answer clear to the Examiners.

(b) A large proportion of the candidates were able to draw the ray bending towards the normal through the block. The emergent ray was frequently not parallel to the incident ray.

Question 22

This question was well done by many of the candidates. The vast majority were able to identify argon as the gas used to fill lamps and the use of chlorine in water purification, however the use of hydrogen to make margarine and the use of oxygen in the steel making process were less well known.

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