COMBINED SCIENCE

Paper 5129/11
Multiple Choice

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

General comments

The majority of candidates answered **Questions 31** and **37** correctly. **Questions 29**, **34** and **36** were found to be very challenging.

Comments on specific questions

Question 1

Many of the candidates were able to correctly identify the white blood cell and the red blood cell. Candidates tended to know that the photograph did not show platelets. In order to secure this mark, candidates needed to confidently differentiate between a red blood cell and a white blood cell.

Question 2

Many candidates knew that the Visking tubing would gain mass due to the movement of water into the Visking tubing. Those candidates who found the question challenging tended to think that the Visking tubing would lose mass and were not sure if this was due to sugar or water moving out.

Question 3

The candidates found this question challenging. They needed to consider the processes of photosynthesis and respiration rather than photosynthesis alone. **A** proved to be a strong distractor with candidates not considering the table heading of "during the night".

Question 4

Most candidates knew that an active 20-year-old man would have a higher energy requirement than the other people quoted in the question.

Question 5

The question was very well answered. The majority of candidates knew that plants wilt because water is lost by transpiration faster than water is absorbed by root hair cells.

Question 6

This was a well answered question by the majority of candidates who knew that increasing the salt intake increased the risk of coronary heart disease.

Question 7

Over half of the candidates knew the products of aerobic respiration and that the process releases more energy than anaerobic respiration. **D** proved to be a strong distractor as many of the candidates knew the products of anaerobic respiration but thought that anaerobic respiration would release more energy than aerobic.

Question 8

It was good to see that many candidates could identify from the body outline the correct organs from which urea and carbon dioxide are excreted. Most candidates knew that carbon dioxide is excreted from the lungs, however, **A** proved to be a strong distractor as some candidates thought that the liver excreted urea.

Question 9

Whilst many of the candidates knew that the plasma transported hormones around the body, all of the distractors were chosen as the correct response by some candidates. Candidates should ensure that they know the functions of the different components of blood.

Question 10

This question proved challenging to candidates. **B** was a very strong distractor as many of the candidates thought that heroin was a stimulant rather than a depressant.

Question 11

The question on deforestation made the candidates consider the changes in the concentrations of gases in the atmosphere and many of the candidates knew that there would be less water vapour and more carbon dioxide. The most common incorrect response was **C**.

Question 12

Many of the candidates knew that only one parent was required for the process of asexual reproduction. The most common incorrect response was that asexual reproduction only occurred in plants.

Question 13

D proved to be a strong distractor with under half of the candidates knowing that a mechanical method of contraception is needed to protect against syphilis.

Question 14

A majority of the candidates were able to read the burette reading.

Question 15

This question was well answered by the stronger candidates but there was evidence of guesswork amongst the weaker candidates.

Question 16

A significant number of the candidates thought that lithium has the same number of electrons as an atom of neon and chose option **B**.

Question 17

This question was well answered by many of the candidates.

Question 18

This question was well answered by the stronger candidates.

Question 19

Candidates needed to know that a solution that contains hydrogen ions is acidic. A large proportion of the candidates answered the question in terms of the properties of acids and chose option **A**.

Question 20

The stronger candidates recognised that X lies on the left of the Periodic Table and that these elements are metallic in character.

Question 21

This question was well answered by a majority of the candidates.

Question 22

Candidates need to ensure that they are familiar with and understand the reactions that take place in the blast furnace. Only a small proportion of the candidates recognised that the combustion of carbon is exothermic and increases the temperature of the furnace. Many of the candidates thought that the reduction of iron represented the removal of impurities from the iron ore and chose option **D**.

Question 23

Most candidates recognised that the least abundant gases in the atmosphere are the inert gases but many of the weaker candidates thought the gas is helium and chose option **B**.

Question 24

The reactions involved in the manufacture of ammonium sulfate are well known by many of the candidates.

Question 25

The fact that methane is the main constituent of natural gas is not well known by a majority of the candidates. A large proportion of the stronger candidates thought that natural gas consists of nitrogen and chose option **C**.

Question 26

Candidates need to ensure that they can interpret chemical equations. A significant number of candidates either ignored the stoichiometry of the equation and chose option **A** or thought that the number 2 only referred to the carbon in the formula of ethene and chose option **B**.

Question 27

The manufacture of ethanol by fermentation and by the hydration of ethene is well known by many of the candidates.

Question 28

The question showed very good discrimination. Candidates need to be sure of the correct definition of "wavelength".

Question 29

This question showed uncertainty and guessing among the candidates with positive distractors from both options **A** and **C**, the "constant" description for the acceleration having been overlooked. More than half of the candidates, in choosing option **B**, did not appreciate the "non-zero" part of the description.

Question 30

This question proved challenging. Candidates need to ensure that they can rearrange the relevant equation correctly, see option **B**, and take into account all the information given, see option **D**.

Question 32

This showed the choice for most candidates to be between option **A** and the key, option **C**, with the latter attracting the most responses.

Question 33

This was well answered although some candidates chose option **A** (f/v) rather than the key, option **B** (v/f).

Questions 35 and 39

Both questions showed very good discrimination with "like charges repel" well known in **Question 35** and nuclide notation in **Question 39**. In both questions, option **B** was the most popular incorrect response.

Question 38

This question showed very good discrimination with the stronger candidates choosing the key, option **C**, and the weaker candidates choosing the remaining options in equal numbers.

Question 40

This question produced very good discrimination although the penetrating properties of nuclear radiations were not well known with a minority of candidates choosing the key, option **B**. Option **D** (gamma-rays) was the most popular incorrect choice.

COMBINED SCIENCE

Paper 5129/12
Multiple Choice

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

General comments

Candidates found **Questions 28**, **29 and 40** to be very challenging and showed, along with **Questions 30**, **34 and 37**, uncertainty and guessing among the stronger candidates.

Comments on specific questions

Question 1

Many of the candidates were able to correctly identify the cell wall as being the structure found in plant cells only. It was evident from the responses that most knew that both cell types had a nucleus.

Question 2

Many candidates knew that the Visking tubing would gain mass due to the movement of water into the Visking tubing. Those candidates who found the question challenging tended to think that the Visking tubing would lose mass and were not sure if this was due to sugar or water moving out.

Question 3

This was a well answered question; most candidates knew how to read the graph in order to find the pH value at which the enzyme works most quickly.

Question 4

Many of the candidates were able to gain this mark for knowing that chewing reduces the size of the food particles.

Question 5

This question was very well answered. The majority of candidates knew that plants wilt because water is lost by transpiration faster than water is absorbed by root hair cells.

Question 6

This was a well answered question by the majority of candidates who knew that drinking more alcohol increased the risk of coronary heart disease.

Question 7

This question proved to be challenging to the candidates. Many had not appreciated that the athlete would have been respiring aerobically during the majority of the race as she was running at a steady pace, and would have been respiring both aerobically and anaerobically for the final 400 m. The candidates tended to consider only one of the two types of respiration.

Question 8

Many candidates could identify from the body outline the correct organs from which urea and carbon dioxide are excreted. Most candidates knew that carbon dioxide is excreted from the lungs, however, **A** proved to be a strong distractor as some candidates thought that the liver excreted urea.

Question 9

Whilst many candidates knew that the liver was the organ that destroys hormones, many other candidates thought that this was a function of the kidneys. Candidates need to be clear about the functions of the liver and the kidneys and to be able to distinguish between them.

Question 10

This question proved challenging to candidates. **B** was a very strong distractor as many of the candidates thought that heroin was a stimulant rather than a depressant.

Question 11

Many of the candidates found this question challenging. **B** proved to be a very strong distractor and candidates need to ensure that they have considered all of the food chains in the food web to ensure that they have identified all of the organisms at a particular trophic level.

Question 12

Most candidates knew that the offspring of asexual reproduction are genetically identical, however, many opted for **D** as there was some confusion as to whether there were one or two parents. It is important that candidates in the future understand that asexual reproduction involves one parent only and produces offspring that are genetically identical.

Question 13

This was a well answered question with many of the candidates knowing that water, oxygen and warmth are necessary for germination.

Question 14

A large proportion of even the stronger candidates thought that filtration and distillation were methods for assess the purity of a substance and chose option **B**. Candidates should be aware that boiling point and chromatography are methods used to test the purity of substances.

Question 15

A majority of the candidates recognised that isotopes have the same proton number.

Question 16

Candidates should be encouraged to use the Periodic Table as a source of information. There was evidence of widespread guesswork particularly amongst the weaker candidates.

Question 17

This proved to be a challenging question for many of the candidates. The stronger candidates recognised that element X has three electrons in its outer shell. There was evidence of guesswork amongst the weaker candidates.

Question 18

This question was well answered by the stronger candidates. A large proportion of the weaker candidates thought that because there are two products that there would be equal masses of each product and chose option **B**.

Question 19

The colour of universal indicator with a solution of carbon dioxide is well known by many of the candidates.

Question 20

The trends shown by the elements in Group VII of the Periodic Table are not well known by a majority of the candidates. There was evidence of widespread guesswork even amongst the stronger candidates.

Question 21

This question was well done by a majority of the candidates.

Question 22

A majority of the candidates recognised that for copper to be used for electrical wiring its conductivity must be high, however, over half of these candidates thought that the melting point must be low and the reactivity must be high and chose option **C**.

Question 23

A majority of the candidates know that chlorine is used to kill bacteria in the water.

Question 24

A majority of the candidates did not recognise that the gas given off when magnesium reacts with dilute sulfuric acid gives a pop when tested with a lighted splint.

Question 25

The uses of the fractions obtained from the fractional distillation of petroleum are not well known by the candidates. There was evidence of widespread guesswork even amongst the stronger candidates.

Question 26

The interpretation of chemical equations needs to be well understood by candidates. A significant number of candidates either ignored the stoichiometry of the equation and chose option **A** or thought that the number 2 only referred to the carbon in the formula of ethene and chose option **B**.

Question 27

There was evidence of widespread guesswork amongst the candidates. Only the strongest candidates recognised that fermentation produces ethanol from a renewable resource.

Question 28

This question proved very challenging, with very few candidates able to work out the **average** velocity, option **C**, in spite of many calculating the car's final velocity (option **D**, the most popular choice).

Question 29

This question showed uncertainty and guessing among the stronger candidates with positive distractors from both options **A** and **C**, the "constant" description for the acceleration having been overlooked. More than half of the candidates, in choosing option **B**, did not appreciate the "non-zero" part of the description.

Question 30

The fact that the man's weight on the Moon was calculated by *mg* was well known but, unfortunately, slightly more candidates, leaving the answer in kg, chose option **C** instead of the key option **D**.

Question 31

Half of the candidates opted for the 2*F* force having the greatest turning effect and chose either option **C** or **D**, with most of the remaining candidates choosing option **B**, the key.

Question 32

This question showed the stronger candidates, unsure whether the extension returned to zero, choosing between the key, option **D**, and option **B** with the key attracting the greater response.

Questions 33 and 38

These questions both showed good discrimination and were well answered.

Question 34

In this question a large percentage of the candidates chose either option **A** or option **B**, the key, in almost equal numbers. Distractors **A** and **D** both attracted some of the stronger candidates.

Question 35

This question proved challenging with more candidates, overlooking the light entering the glass block (a denser medium), choosing both options **C** and **D** than did the key, option **B**.

Question 36

This question showed good discrimination but the key, option **C**, only attracted a response from a third of the candidates with the remainder equally divided among the distractors.

Question 37

This question required more careful thought among the candidates, with slightly more choosing option **C** than the key, option **B**, and some stronger candidates choosing either option **A** or option **D**, particularly the former.

Question 39

This question showed very good discrimination with weaker candidates choosing the neutron number, option **B**, as the indicator for the electron number of an atom.

Question 40

The ionising abilities of the different nuclear radiations needed to be better known by candidates. A very high percentage of candidates chose either option **B** or **C** rather than option **A**, the key.

COMBINED SCIENCE

Paper 5129/21
Theory

General comments

In Physics calculations, more candidates are beginning to show their working and write the formula used in the calculation. Candidates should also be aware that the correct symbols for the quantities in the formula should be used.

The candidates' responses to some of the recall and observation questions in the Biology section of the paper were quite good. Questions that required some explanation of the observations showed less understanding and more detail was required.

The answers to the Chemistry calculation questions were better than in previous examinations. The answers to recall questions were less well done.

There are certain areas of the syllabus that need to be better understood by the candidates, most notably radioactivity, organic chemistry and electrical circuits.

Comments on specific questions

Question 1

(a) (i) This proved to be a straightforward question for the stronger candidates. A significant number of the candidates thought that the stoichiometry of the equation should be included in the calculation of the relative molecular mass, M_r.

(ii) The calculation proved to be straightforward for the stronger candidates. Of those candidates who had difficulty with the calculation, a large proportion understood that the mass of nitrogen dioxide produced by 12.6g of nitric acid is a 20^{th} of the value calculated for the mass produced from 252g of nitric acid.

(b) Candidates should be aware that in the test the emphasis is on the **glowing** splint rather than a lighted splint or simply a splint.

(c) A large proportion of the candidates recognised the acidic nature of nitrogen dioxide. Fewer candidates indicated that nitrogen dioxide is soluble in water and then causes acid rain.

Question 2

(a) The concept of the half-life of a radioactive substance needs to be better understood by candidates. Candidates should know that half-life is determined by finding the amount of time taken for the count rate to decrease to half the original count.

(b) A significant proportion of the candidates stated that the proton number, *Z*, decreases by 2 when an alpha-particle is emitted from a radioactive substance. The strongest candidates were also able to explain that an alpha-particle contains two protons.

(c) This question proved challenging for the vast majority of the candidates. Candidates should be aware that gamma radiation is electromagnetic radiation and is uncharged.

Question 3

This question proved to be straightforward for the vast majority of the candidates.

Question 4

(a) The idea that a hydrogen atom differs from atoms of all the other elements because it does not contain any neutrons is needs to be understood candidates.

(b) The "dot and cross" diagram for the water molecule was well known by a majority of the candidates.

(c) (i) The use of water acting as a solvent when it dissolves sodium chloride is well known by many of the candidates.

(ii) The effect of adding sodium chloride to water on the boiling point of water needs to be better understood by many of the candidates.

Question 5

(a) (i) The majority of the candidates were able to name the structures **A** and **B** on the diagram of the section through a root hair cell.

(ii) The functions of the nucleus and the cell wall are well known by many of the candidates.

(iii) The fact that the root hair cell has a large surface area is well known by the candidates.

(b) (i) A majority of the candidates interpreted the data correctly.

(ii) A majority of the candidates interpreted the data correctly.

(iii) The strongest candidates were able to suggest a reason for the results in the data. Candidates should know that the root hair cells grow longer when the concentration of nitrogen-containing ions is low in order to search for those ions.

(iv) The fact that nitrogen-containing ions are needed by plants to make amino acids / proteins needs to be better known by many of the candidates.

Question 6

(a) A straightforward question for the vast majority of the candidates.

(b) A straightforward question for the vast majority of the candidates.

(c) Many candidates were able to calculate the mass of the plastic block.

Question 7

(a) The name given to the elements in Group VII of the Periodic Table was well known by a large proportion of the candidates.

(b) Candidates were expected to state that diatomic refers to a **molecule** that contains two atoms. Their responses required greater precision.

(c) The stronger candidates were aware that bromine solution is used to distinguish between saturated and unsaturated hydrocarbons and state the correct observations.

(d) (i) The product of the reaction between bromine solution and potassium iodide needed to be better known by a majority of the candidates. Candidates should know that bromine displaces iodine from the solution and forms potassium bromide.

(ii) The fact that chlorine is more reactive than bromine and therefore is not displaced by bromine is known only by the strongest candidates.

Question 8

(a) A large number of the candidates' responses required greater detail. The energy source is geothermal rather than simply thermal.

(b) This question was well answered by a majority of the candidates.

(c) This question was well answered by the stronger candidates although some of the candidates had difficulty working with standard form.

Question 9

(a) The vast majority of the candidates recognised that an enzyme is a biological catalyst. The stronger candidates indicated that enzymes are proteins.

(b) (i) A majority of the candidates were able to interpret the graph to describe how enzyme activity varies with temperature. Candidates should be reminded that enzymes are denatured at high temperature and that it is incorrect to state that they die.

(ii) The dependence of enzyme activity on the pH was known by the stronger candidates.

(c) In general, the candidates' responses needed greater detail; they referred to the enzymes speeding up the reactions involved in germination. Candidates were expected to state that enzymes convert stored starch into glucose.

Question 10

Many of the candidates found this question challenging. The most common correct answers were zinc is mixed with copper to make brass, aluminium is resistant to corrosion due to an oxide layer and calcium carbonate is used to remove acidic impurities in the blast furnace.

Question 11

(a) This question was well answered by the stronger candidates. Some of the weaker candidates misread the scale on the *y*-axis and gave the voltage output as 4.25.

(b) Many of the candidates were able to name another component of an a.c. generator.

(c) This question proved to be challenging for the vast majority of the candidates. Candidates were expected to explain the change in voltage output is caused the magnet rotating so that the coil cuts the magnetic field.

Question 12

This question was well answered by a majority of the candidates.

Question 13

(a) The fact that the fuse is connected to the live wire and the fuse melts when the current exceeds the fuse rating is known to a minority of the candidates. There is a misconception amongst many of the candidates that the fuse **controls** the amount of current passing through the wire.

(b) The idea that wire Z, the earth wire, carries the current to earth and prevents the casing of the appliance becoming live needs to be better understood by the majority of the candidates.

(c) The vast majority of the candidates were able to state a hazard of damaged insulation.

(d) Many of the candidates could recall the formula V = IR but a number of the candidates had difficulty rearranging the formula to make current the subject of the formula.

Question 14

(a) This question proved to be challenging for a large number of the candidates. A significant number of candidates were able to state the name of the acid. Only a small number of these candidates named potassium hydroxide as the alkali.

(b) The properties of ionic compounds are quite well known by the stronger candidates.

(c) (i) This question was well answered by a majority of the candidates.

(ii) This question proved challenging for many of the candidates. Candidates were expected use the value of the solubility of potassium nitrate at 40 °C and subtract this value from the 106 g given in the question.

Question 15

The processes involved in the carbon cycle need to be better known by the candidates.

Question 16

(a) The majority of the candidates recognised that the rubber sheet changes shape due to the weight of the water.

(b) The vast majority of the candidates completed the calculation successfully.

(c) (i) A large proportion of the candidates described the results of the experiment rather than described how the material is tested. Candidates were expected to state that weights are added to the rubber sheet and then measure the extension.

(ii) A large proportion of the candidates recognised that the extension increased as the load increased. The strongest candidates recognised that the extension is not proportional to the load.

(iii) The vast majority of the candidates recognised that the rubber material returns to its original length when the load is removed.

Question 17

(a) The stronger candidates were able to explain that petroleum is separated by fractional distillation because the fractions have different boiling points.

(b) The uses of the fractions obtained from the fractional distillation of petroleum needs to be better known by many of the candidates.

COMBINED SCIENCE

Paper 5129/22
Theory

General comments

In Physics calculations, more candidates are beginning to show their working and write the formula used in the calculation. Candidates should be aware that the correct symbols for the quantities in the formula should be used.

The candidates' responses to some of the recall questions in the Biology section of the paper were quite good. Those questions that required some explanation were less well understood and more detail was required.

The Chemistry questions were less well answered than in previous examinations.

There are certain areas of the syllabus that need to be better understood by the candidates, most notably radioactivity, alloys and organic chemistry.

Comments on specific questions

Question 1

This question was well answered by the stronger candidates. The description of the melting point, density and electronic structure of the ion were less well known by the weaker candidates.

Question 2

(a) The concept of the half-life of a radioactive substance needs to be better understood by a large proportion of the candidates. Candidates should know that half-life is determined by finding the amount of time taken for the activity to decrease to half the original activity.

(b) (i) A significant proportion of the candidates stated that the nucleon number, *A*, remained the same when a beta-particle is emitted from a radioactive substance. The strongest candidates were also able to explain why the nucleon number remained the same. Candidates should understand that a neutron changes to a proton and the resulting electron is emitted.

(ii) This question proved challenging for the majority the candidates. Candidates needed to understand the term "nature of an alpha-particle" in the question. Many of the candidates stated that an alpha-particle is helium, rather than a **helium nucleus,** or quoted nuclide notation for helium without the charge on the particle.

Question 3

This question was well answered by the vast majority of the candidates. There is a misunderstanding amongst the weaker candidates about the parts responsible for the formation and excretion of urea.

Question 4

(a) (i) This proved to be a straightforward question for the stronger candidates. A significant number of the candidates thought that the stoichiometry of the equation should be included in the calculation of the relative molecular mass, M_r, and obtained the answer 204.

(ii) Candidates needed to recognise the significance of the mass of 312 g of aluminium hydroxide on their calculation. A large proportion of the candidates understood that the mass of aluminium oxide produced by 7.8 g of aluminium hydroxide is a 40^{th} of the value calculated for the mass produced from 312 g of aluminium hydroxide.

(b) The fact that low density and strength are properties of aluminium that make it useful for the manufacture of aircraft parts needed to be better known by candidates. Many of the candidates thought that the resistance to corrosion, a chemical property, is the reason that aluminium is used for manufacturing aircraft parts.

(c) (i) The meaning of the term *alloy* is known by the stronger candidates. A significant number of candidates referred to a combination of two or more metals rather than a **mixture** of two or more metals.

(ii) The idea that metals are made into alloys in order to change their properties needed to be better known by the candidates.

Question 5

(a) The stronger candidates recognised that the energy source is the wind. A significant number of the candidates gave their answer as a type of energy (i.e. kinetic energy) rather than the source of energy.

(b) The vast majority of the candidates were able to identify at least one of the types of energy transfer.

(c) The calculation was well done by a majority of the candidates.

Question 6

(a) The name of an ore of iron was not well known by the candidates.

(b) Candidates should understand that reduction means that a substance loses oxygen in the reaction. The strongest candidates were able to explain the meaning of the term “iron ore is reduced”.

(c) (i) The two substances that are required for iron to rust are quite well known by the candidates.

(ii) The process of coating iron with zinc, galvanisation, to prevent it from rusting needs to be better known by many of the candidates.

(d) The fact that iron is used as a catalyst in the manufacture of ammonia needs to be better known by a large proportion of the candidates. Those candidates who recognised that iron is a catalyst invariably explained that a catalyst speeds up a chemical reaction.

Question 7

(a) The stronger candidates recognised that the process being investigated is photosynthesis.

(b) The idea that starch is not produced in the part of the leaf that is covered was recognised by many of the candidates. A number of these candidates did not indicate that starch is produced in the uncovered part of the leaf.

(c) Most candidates recognised that carbon dioxide and water are required for the synthesis of starch. To be awarded all the available credit responses required greater detail. Candidates should be aware that the carbon dioxide and water combine to form glucose when light is absorbed by the chlorophyll in the leaf, which is then converted to starch.

(d) Only a small number of candidates stated that the plant is placed in the dark before the experiment in order for the plant to use up all the stored starch in the leaf.

(e) Candidates were expected to state that water is required to make starch or to prevent the plant from wilting. The reason for placing the plant in a bowl of water was not well known by many of the candidates.

Question 8

(a) Candidates need to understand the concept of fixed points on the Celsius scale. A significant number of the candidates simply stated the temperature shown on the thermometer in **Fig. 8.1**.

(b) A large number of candidates answered this question in terms of a liquid in glass thermometer rather than the digital thermometer illustrated in the diagram.

(c) Candidates should understand that the range of a thermometer is the minimum and maximum temperature that the thermometer is able to measure and the sensitivity is the ability to detect a small change in temperature. The idea of range and sensitivity of a thermometer are not well understood by a large number of the candidates,

Question 9

(a) This question proved to be challenging for a large proportion of the candidates.

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

Question 10

(a) Many candidates recognised that fertilisation involves a sperm and an ovum but the responses tended to refer to what happens to the zygote after it has formed rather than the fertilisation process.

(b) A large proportion of the candidates knew about the hormonal and the mechanical forms of contraception but the natural and surgical methods were less well known

Question 11

(a) (i) The stronger candidates were able to identify the process used to decompose octane as cracking.

(ii) This question proved challenging for many of the candidates. The meaning of the stoichiometry of a chemical equation needed to be better understood amongst many of the candidates.

(b) (i) A significant proportion of the candidates recognised that ethene contains a double bond. Only the strongest candidates stated that it is carbon to carbon double bond.

(ii) The strongest candidates identified that bromine is the reagent used to distinguish between ethene and ethane.

(c) The uses of ethene need to be better known by the vast majority of the candidates. Candidates should know that ethene is used to manufacture ethanol and poly(ethene)

Question 12

(a) A majority of the candidates were able to name the meter in the diagram.

(b) Better understanding of this part of the syllabus is needed by a large proportion of the candidates. Candidates are expected to know that the magnetic field cuts the coil and produces an e.m.f. / current in the circuit.

(c) The idea that repulsion is caused by the magnet and coil having the same pole needs to be known by the candidates. They need to be clear about what is meant by a magnetic pole and by an electric charge and not to confuse them.

Question 13

(a) (i) Many of the candidates were able to read the graph correctly. A significant number of candidates misread the scale on the *x*-axis and gave their answer as 8.5s.

(ii) This question was well answered by a majority of the candidates.

(b) A large number of candidates were able to determine the speed at 8s but the type of motion was less well answered.

(c) A large proportion of the candidates recognised that the type of motion between 10s and 16s is acceleration but many of these candidates did not also state that the type of motion is **non-uniform / non constant** acceleration.

Question 14

This proved to be a straightforward question for a majority of the candidates.

Question 15

(a) A significant number of candidates were able to work out the stoichiometry for the carbon dioxide and water. Many of these candidates found working out the number of oxygens involved in the reaction challenging.

(b) (i) This question was well answered by the vast majority of the candidates.

(ii) Many of the candidates who recognised that the amount of carbon dioxide in the atmosphere increases explained their answer in terms of the evaporation of water rather use the information in the graph that the solubility of carbon dioxide in water decreases as the temperature increases,

Question 16

(a) Candidates needed to take note of the information in the question that energy is conserved. A large proportion of the candidates tried to calculate the energy from information given in the question.

(b) This question was well done by those candidates who could recall the formula Q = It.

(c) The strongest candidates were able to calculate the potential difference across the lamp using the formula V = E / Q.

Question 17

(a) (i) Candidates need to know the shape of a converging lens. They should also read the whole question carefully. Some believed that the dotted area A represented a glass block as shown by their responses to **(a)(ii)**.

(ii) This part of the question was marked independently of **(a)(i)** so that candidates who drew converging rays were given credit.

(b) This question was well done by the stronger candidates.

Question 18

(a) This question was well answered by many of the candidates. Some of the candidates referred to foodstuffs such as fruit or vegetables rather than the components of a balanced diet.

(b) Candidates must read the question carefully, a significant number of them gave an answer in terms of nutrition, however, many of the candidates were able to give at least one advantage of breast-feeding.

Question 19

(a) This question was well answered by a majority of the candidates.

(b) A large proportion of the candidates stated that the particles in a gas move freely which is not different to particles in a liquid. Candidates were expected to state that the particles in a gas move faster and are further apart than particles in a liquid.