PRINCIPAL EXAMINER'S REPORT

BOTSWANA
EXAMINATIONS
COUNCIL

JCE SCIENCE

2025

Advancing learning, certifying your future

PAPER 1: MULTIPLE CHOICE

General Comments

The performance of the candidates was similar to that of the previous year with a slight increase in the mean from 16.57 to 17.91. As usual, the performance varied across the items with some having very high proportions of candidates getting the item correct while others had very low proportions.

The strongest distractors across the options generally indicate that there were some misconceptions that were shown by the candidates and hence should be used as an indicator for identifying the next steps to rectify such misconceptions during teaching and learning.

Generally, Multiple-Choice items have a guessing factor that is considered to be the lowest proportion of being able to get the item correct without necessarily knowing the answer. For a Multiple-Choice item with four options, the guessing factor is 25% and any item which has the proportion of candidates who got it correct lower than the guessing factor is a cause for concern. Candidates should be encouraged to always read the question for understanding before they select an answer.

The report is mainly in table format, showing the proportion of candidates at each of the options. The key for reading the table:

Prop. the percentage of candidates that selected the option as their answer

Key the option that was taken as the answer for the item

Comments on Individual Items

Question 1

Option	Prop.	Key	Comments
A	0.23	B	The item was fairly done though it is a recall question which all candidates must be aware of the conditions for formation of fossil fuels. The strongest distractor was high pressure.
B	0.51		
C	0.10		
D	0.15		

Question 2

Option	Prop.	Key	Comments
A	0.14	C	Well done. Most of the candidates were able to recall that genes are the basic units of inheritance.
B	0.08		
C	0.68		
D	0.09		

Question 3

Option	Prop.	Key	Comments
A	0.23	B	Poorly done. The candidates were evenly spread across the options showing lack of understanding of the concept. Scalar quantities have magnitude only while vectors have magnitude and direction.
B	0.25		
C	0.28		
D	0.24		

Question 4

Option	Prop.	Key	Comments
A	0.32	D	Fairly done. The determining factor for the pitch of a sound is frequency. The larger the frequency the higher the pitch of a sound. The strongest distractor was A, which has the largest amplitude and loudest sound.
B	0.05		
C	0.09		
D	0.54		

Question 5

Option	Prop.	Key	Comments
A	0.14	B	Well done. Candidates were able to relate the use of glass apparatus with the likelihood of cuts on hand as being the major laboratory hazard.
B	0.61		
C	0.14		
D	0.11		

Question 6

Option	Prop.	Key	Comments
A	0.47	A	Fairly done. The use of internet increases the spread of misinformation mainly because the information reaches many people within a short time. The information can be checked for accuracy which in most cases is done after the information has been spread.
B	0.21		
C	0.15		
D	0.17		

Question 7

Option	Prop.	Key	Comments
A	0.08	C	The candidates were expected to deduce the spring constant from the first diagrams and use the information to determine the length. A mass of 30 g produces an extension of 3 cm hence 20 g produces an extension of 2 cm. Option B was the strongest distractor.
B	0.42		
C	0.42		
D	0.08		

Question 8

Option	Prop.	Key	Comments
A	0.31	C	Fairly done. The strongest distractor was A, where the isobars are far from each other. The wind is strongest when the isobars are close to each other and this was in region R only.
B	0.10		
C	0.50		
D	0.08		

Question 9

Option	Prop.	Key	Comments
A	0.24	A	Poorly done. The distribution of the candidates indicates that the candidates were guessing. Candidates should be told the uses of the different optical devices
B	0.24		
C	0.23		
D	0.29		

Question 10

Option	Prop.	Key	Comments
A	0.39	A	Poorly done. Candidates should be made aware that light undergoes refraction at each boundary and the bending depends on the colour of light. The light that emerges is of the rainbow colours with red light bending less and violet light bending most.
B	0.17		
C	0.27		
D	0.17		

Question 11

Option	Prop.	Key	Comments
A	0.27	A	Poorly done. The candidates had to know the function of the pupil for them to relate it with a part in the camera. The pupil regulates the amount of light that enters the eye hence the part that regulates light into camera is the aperture.
B	0.07		
C	0.52		
D	0.14		

Question 12

Option	Prop.	Key	Comments
A	0.24	A	Poorly done. The item required principle of moments, M = F × d. When distance is increased, the turning effect is increased with the same amount of the gentle force. Options B and D are strongest distractors.
B	0.38		
C	0.14		
D	0.24		

Question 13

Option	Prop.	Key	Comments
A	0.27	D	Fairly done. The candidates were being tested on the concept of like charges repelling each other. The responses indicate that the candidates were not aware of the observations made when like charges are brought close to each other.
B	0.24		
C	0.06		
D	0.42		

Question 14

Option	Prop.	Key	Comments
A	0.38	A	Poorly done. This is a simple concept that all candidates should be aware of. Earthing is done using the Earth wire. The strongest distractors included the fuse which used for protection against large currents.
B	0.23		
C	0.25		
D	0.15		

Question 15

Option	Prop.	Key	Comments
A	0.19	B	Poorly done. The strongest distractor was D. The resistance of a conductor depends on the thickness and length of the conductor. Thus, the thinner the wire the larger the resistance and the longer the wire the larger the resistance.
B	0.37		
C	0.11		
D	0.32		

Question 16

Option	Prop.	Key	Comments
A	0.49	A	Fairly done. The item was testing the concept of current in parallel circuits. The sum of current in branches of circuit is equal to the total current in the circuit. Strong distractor was B.
B	0.26		
C	0.11		
D	0.13		

Question 17

Option	Prop.	Key	Comments
A	0.04	B	Well done. The candidates were able to identify the telescope as a device that uses lenses to view distant objects.
B	0.67		
C	0.23		
D	0.06		

Question 18

Option	Prop.	Key	Comments
A	0.26	D	Fairly done. The strongest distractors were A and B. An average number of the candidates identified lithosphere (solid earth) as having the core, mantle and the earth crust.
B	0.22		
C	0.11		
D	0.41		

Question 19

Option	Prop.	Key	Comments
A	0.30	D	Poorly done. The candidates were to understand the process of distillation, where mixtures are separated based on differences in boiling point. The candidates should then be able to identify processes that occur during boiling which are evaporation from the liquid and condensation when cooling.
B	0.22		
C	0.10		
D	0.38		

Question 20

Option	Prop.	Key	Comments
A	0.27	D	Poorly done. This is a simple recall question which shows that the candidates had challenges with. Crude oil uses the differences in boiling points to separate the components.
B	0.13		
C	0.27		
D	0.34		

Question 21

Option	Prop.	Key	Comments
A	0.24	C	Fairly done. The candidates have to understand that impurities lower melting point and increase boiling point. The melting point has to be lower than 0 °C and higher than 100 °C, which is option C.
B	0.17		
C	0.40		
D	0.19		

Question 22

Option	Prop.	Key	Comments
A	0.57	A	Fairly done. The candidates were expected to identify a possible metal using the density, melting point and electrical conductivity. Metals are good conductors of electricity and have high melting point.
B	0.10		
C	0.24		
D	0.09		

Question 23

Option	Prop.	Key	Comments
A	0.25	B	Poorly done. The candidates were expected to interpret the heating curve of a substance and identify a stage where the substance was melting. Melting happens at a constant temperature i.e. where the line is horizontal. The candidates were guessing and failed to interpret the graph.
B	0.27		
C	0.27		
D	0.21		

Question 24

Option	Prop.	Key	Comments
A	0.33	A	Poorly done. The item was testing candidates knowledge on reactions between acids and carbonates. One of the products should be carbon dioxide. Most candidates selected sulphur dioxide (from sulphuric acid) as their answer.
B	0.17		
C	0.11		
D	0.39		

Question 25

Option	Prop.	Key	Comments
A	0.11	B	Poorly done. The item required candidates to analyse the melting and boiling points of substances and determine which one is a liquid at 55 °C. The item should have reached the melting point but not lower than or exceeded the boiling point. Thus, substance C has exceeded the boiling point.
B	0.31		
C	0.47		
D	0.11		

Question 26

Option	Prop.	Key	Comments
A	0.17	C	Fairly done. A good number of candidates were able to recall that carbon dioxide turns lime water milky. There were a few who thought it was lighter than air.
B	0.24		
C	0.50		
D	0.09		

Question 27

Option	Prop.	Key	Comments
A	0.31	B	Fairly done. The candidates were mainly split between options B and A. Thus, the candidates were aware that brass contains zinc but were not aware of the other metal which is copper.
B	0.43		
C	0.08		
D	0.18		

Question 28

Option	Prop.	Key	Comments
A	0.05	B	Well done. The candidates were able to select the organs that are found in the rib cage being the heart and the lungs. The strongest distractor was C.
B	0.67		
C	0.20		
D	0.08		

Question 29

Option	Prop.	Key	Comments
A	0.20	C	Fairly done. Candidates were able to note that oxygen is required to break down sugar and provide energy.
B	0.21		
C	0.41		
D	0.18		

Question 30

Option	Prop.	Key	Comments
A	0.26	D	Fairly done. Most candidates were able to notice that the cell wall was matched with its function, supporting the cell.
B	0.12		
C	0.10		
D	0.52		

Question 31

Option	Prop.	Key	Comments
A	0.09	D	Well done. Most candidates were able to recall that reproduction and body cover are used for classification of organisms.
B	0.15		
C	0.10		
D	0.66		

Question 32

Option	Prop.	Key	Comments
A	0.14	C	Poorly done. The candidates were on the main split between options C and D. Candidates should note that they were to determine the growth per week as indicated by change in length divided by the number of weeks for the period.
B	0.18		
C	0.36		
D	0.32		

Question 33

Option	Prop.	Key	Comments
A	0.24	B	Poorly done. The candidates were mainly split between options B and C, which are both neurones, sensory and relay neurone respectively. There were some candidates who opted for A which is the receptor.
B	0.35		
C	0.29		
D	0.12		

Question 34

Option	Prop.	Key	Comments
A	0.15	B	Well done. This is a simple recall question that wanted candidates to identify the part of a flower that develops into a seeds.
B	0.60		
C	0.13		
D	0.12		

Question 35

Option	Prop.	Key	Comments
A	0.30	A	Poorly done. The candidates were expected to interpret the pyramid of biomass which shows that the total mass of the organisms decreases as one moves up the level and provide an explanation for the decrease. Thus, not only the mass decreases but also the energy decreases. The candidates focused on the size of the organisms but not the energy levels..
B	0.14		
C	0.25		
D	0.32		

Question 36

Option	Prop.	Key	Comments
A	0.13	D	Well done. The item wanted candidates to identify factors necessary for photosynthesis to take place, which candidates did well to identify removal of carbon dioxide as a limiting factor.
B	0.16		
C	0.12		
D	0.59		

Question 37

Option	Prop.	Key	Comments
A	0.21	B	Fairly done. The candidates were able to identify the liver, stomach and pancreas as being parts of the circulatory system. The strongest distractors were A and C, which both had one organ which was not correct.
B	0.52		
C	0.23		
D	0.04		

Question 38

Option	Prop.	Key	Comments
A	0.15	C	Well done. The candidates were able to select an involuntary action from the list.
B	0.10		
C	0.67		
D	0.08		

Question 39

Option	Prop.	Key	Comments
A	0.28	D	Poorly done. The candidates were to select processes that add carbon dioxide to the atmosphere, which are respiration and combustion. Photosynthesis, which was selected by most candidates uses carbon dioxide from the atmosphere as a reactant.
B	0.10		
C	0.26		
D	0.36		

Question 40

Option	Prop.	Key	Comments
A	0.52	A	Fairly done. The candidates were mainly spread between options A and C. Both substances are used when testing the leaf for starch with alcohol removing the colour from the leaf.
B	0.10		
C	0.32		
D	0.07		

PAPER 2: SHORT ANSWER AND STRUCTURED ITEMS

General Comments

In general, candidates' performance in science is still below par. Most candidates continue to demonstrate insufficient mastery of the skills as stated in the assessment syllabus. There is need for Centres to familiarise themselves with the assessment syllabus to prepare candidates well for examinations.

(a) Application and problem solving

Candidates are expected to demonstrate the ability to solve problems, translate information from one form to another, manipulate data and identify patterns. It is evident from candidates' responses, that they continue to fall short in the demonstration of these skills. There was no clear difference between the current cohort and the last year's cohort.

(b) Experimental and scientific investigations

Candidates are expected to demonstrate knowledge, understanding and interpretation of experimental set-ups as well as making observation, drawing conclusions and analysis and interpretation of data. Candidates continue to demonstrate inadequate acquisition of these skills. As much as possible, Centres are encouraged to ensure that laboratories are equipped, and candidates are given opportunities for hands-on experiences through laboratory experimentation and investigations. As far as the demonstration of mastery of these skills is concerned, there is no change from last year.

(c) Analysis of results using graphs

In science, plotting of graphs is a very important tool in the analysis of results from tables. There has been some positive improvement in candidates' ability to plot graphs over the years. Centres are encouraged to continue emphasising the proper way of plotting and drawing graphs.

(d) Computational / mathematical skills

Mathematical computations continue to improve, especially with upper grades. However, with lower grades there is no observable change, challenges such as use of correct units and correct significant figures still persist. Centres are encouraged to train candidates on the correct sequence of solving mathematical problems. I addition candidates need to present clear and neat work.

Candidates continue to make spelling mistakes and fail to adhere to question instructions such as labelling diagrams as instructed. They fail to make distinctions between command words such as state, describe and explain.

Comments on Individual Questions

1 (a) Well done. The candidates were expected to identify organ X from the diagram with most of them labelling it correctly as the stomach.

(b) Poorly done. Most candidates failed to understand the task, which required a description of peristalsis being contraction and relaxation of muscles. Most candidates stated the name of the process (Peristalsis) instead of the description. Candidates gave answers such as food mixes with saliva to flow easily to the stomach, the gullet expands and contracts, through swallowing, the gullet muscles contract and pushes the food. Centres are advised to teach candidates on the expectations of the different command words.

(c) Fairly done. The question was focusing on the role of saliva when mixed with food which is mainly on chemical digestion and lubrication. Most of the candidates scored one out of the possible two marks as they only focused on lubrication only and did not cover the aspect of digestion by salivary amylase. The expected responses were for easy swallowing/lubrication and digestion of starch. Some of the responses that were not credited included: easy digestion, easy absorption, prevent choking. Centres are advised to cover the purpose of saliva in details including chemical digestion of starch.

2 **(a)** **(i)** Poorly done. The question expected candidates to demonstrate knowledge on the direction of flow of blood into the heart from the lungs. Candidates should be advised that the oxygenated blood from the lungs enter the side of the heart that has thicker muscles from where it is pushed to the rest of parts of the body. The candidates were expected to show their understanding by labelling the arrows. Candidates failed to notice that oxygen poor blood from the body enters the heart through the vena cava while oxygen rich blood from the lungs enters the heart through the pulmonary vein hence it was important to label the arrows as expected to differentiate the blood vessels.

(ii) Poorly done. Most candidate failed to follow the instruction of the question which required the drawing of arrows to show the direction of blood flow. The candidates were to show the blood flow out of the heart to the body. Some candidates drew all the arrows to show blood flow into and out of the heart (both oxygenated and de-oxygenated blood), failing to provide the correct response that required two arrows.

(b) **(i)** Well done. Most candidates were able to provide the correct name for bicuspid valves. Some candidates gave names of the valves such as tricuspid or semilunar valves, which did not score.

(ii) Fairly done. The candidates were to state that the valves open but most of them gave answers such as valves expand or ‘relaxes to enable flow of blood into the heart’.

(c) Fairly done. The answer was to be for diseases that are related to the circulatory system like heart attack, high blood pressure and stroke. A good number of candidates gave responses such as HIV, high blood, heart disease, blood diseases (e.g. anaemia), which were not in any way addressing the question. High blood though commonly used is not the full name for the disease and Centres should emphasise to candidates the importance of writing full names.

3 **(a)** Fairly done. Most of the candidates were able to recall the name of the chemical but they were challenged by the correct presentation of the name. Some candidates wrote benedict instead of Benedict’s solution. The were a few candidates who gave iodine solution as their answer.

(b) Well done. Most candidate were able to correctly identify food sample **M** to be having the least nutrients. This was due to the fact that it only had proteins while the other three were absent.

(c) Well done. Most candidate were able to correctly identify food sample **N**. The sample had starch and glucose which are all vital sources of energy.

(d) Poorly done. It appears most candidates did not understand the essence of the question, that salivary amylase digests starch in the food sample into glucose. Some candidates were able to state that starch is digested to glucose but could not score marks because they did not state the changes in the results. A number of candidates were able to score one mark, by stating that 'glucose will be present because starch is digested'.

4 **(a)** Well done. Most candidates were able to correctly label letter **X** at the ovary. There were some candidates who omitted the question. Centres should encourage candidates to read through all the questions and not focus on questions with answer spaces only. Candidates should also be advised to avoid using arrows when labelling diagrams.

(b) Well done. Most candidate were able to recall the part labelled **W** as the uterus.

(c) Faily done. The candidates were expected to deduce the method of birth control, tubal ligation, from the diagram. The common wrong answer was vasectomy, a procedure which is done in men.

(d) Faily done. Most candidates failed to realise that the method when used alone, does not prevent the spread of STIs. Candidates should be made aware that science evolves and they should always look for areas that change within the different fields of science. While it was acceptable that the procedure is irreversible or permanent, it is however reversible. Some of the common wrong responses were infertility and it can transmit diseases.

(e) Well done. Most candidates were able to name a sexually transmitted disease that included HIV/AIDS, gonorrhoea, chlamydia, genital warts, genital herpes, although some stated HIV which did not score. Other common wrong responses included tuberculosis and herpes. Centres are advised to remind candidates that they should use correct acronyms; HIV/AIDS not hiv/aids.

5 **(a)** Well done. The candidates were expected to identify process **X**, which was change of solid to gas and process **Y** being change of liquid to gas. Most candidates were able to identify **X** and **Y** as sublimation and evaporation respectively. Some candidates misspelled the word sublimation. The most common wrong response for process Y was boiling, which does not involve a change of state.

(b) Poorly done. The candidates were expected to note that a change from gas to liquid makes particles to lose energy. A few candidates were able to score the first marking point; particles will become closer to each other. But most missed the other marking point; particles lose kinetic energy. Some candidates gave answers such as particles will condense and particles will become closely packed.

6 **(a)** Well done. Most candidates were able to state the period as period 2. One common wrong answer was second period. Centres should advise candidates on how to present information using acceptable scientific notation. Some candidates identified the group instead of the period.

(b) Poorly done. The candidates were expected to recall the trend of the atomic size which decreases as you move from left to right. Common wrong answer were the atomic size increases, and the atomic size remains the same.

(c) Well done. Most candidates were able to access the mark as they noted that nitrogen is in group V though some provided the answer as group 5, which is not the formal way of presenting the group numbers.

(d) Well done. Most candidates were able to recall the properties of oxygen with the most common answer being oxygen supports burning. Some candidates gave responses such as oxygen is soluble in water. Oxygen is only slightly soluble in water. Other correct responses which were not popular are colourless, odourless, tasteless, denser than air.

7 **(a)** Faily done. The most common wrong answer was iron ore instead of the name of the iron ore itself which was either haematite or magnetite.

(b) Poorly done. Limestone is added to remove impurities, but most candidates gave responses such as limestone acts as a catalyst, to neutralize the coke, to react with the iron ore and to make the iron soft.

(c) Faily done. The candidates were to identify molten slag as the product from outlet Y but gave answers such as molten iron.

(d) Fairly done. Most candidates interchanged the answers to (c) and (d). They gave molten slag as the answer instead of molten iron. Other common wrong responses were carbon dioxide and waste products. Candidates should be made aware that iron is collected at the lower outlet while impurities (slag) is collected from the top outlet.

(e) Fairly done. Candidates were expected to complete the equation for a carbonate where it decomposes into carbon dioxide and calcium oxide. Most candidates were able to access one mark for carbon dioxide but failed to identify the other product being calcium oxide. Common wrong answers were calcium, iron and calcium chloride. Centres are advised to emphasise to candidates the importance of having the same elements on the reactants and product sides.

8 **(a)** Poorly done. Most candidates failed to note that solar energy was being harnessed to charge a battery thus light energy was being converted to electrical energy. Most candidates referred to absorption of heat rather than light. Centres are advised to familiarise candidates with instruments such as solar panels and solar water heaters, because although black colour is a good absorber of heat and light, in the case of solar panels what is absorbed is light energy rather than heat energy, and the light energy is converted to electrical energy.

(b) Fairly done. The candidates had to identify the energy in the wires, electrical, and a form of stored energy being chemical potential energy. There were responses such as kinetic energy, electricity instead of electric energy.

(c) **(i)** Well done. Most candidates were able to correctly calculate the electrical energy using the correct formula *Energy* = *Power* × *time*. A few candidates divided the power by time. Centres are advised to train students to write the equation prior to calculations.

(ii) Poorly done. Most candidates multiplied cost per unit charge by the time, 0.8 × 2 instead of multiplying electrical energy by cost per unit charge, 2.4 × 0.8 / electrical energy × cost per kWh

(d) Poorly done. Some candidates were able to score one mark out of the two as they were able to state that harnessing solar energy does not produce carbon dioxide gas. However, most candidates failed to score the other mark, that harnessing solar energy does not cause the greenhouse effect. It appears most candidates confuse environmental concepts providing responses such as global warming, destruction of the ozone layer and deforestation. Some of the wrong responses included it does not harm the environment, it is environmentally friendly, does not cause air pollution, no emission of poisonous gases, reduces emission of carbon dioxide.

Answers: **(c)** **(i)** 2.4 kWh **(ii)** P1.92

9 **(a)** Well done. Most candidates were able to correctly calculate the speed by dividing the distance by time. Some lost a mark for wrong units.

(b) **(i)** Well done. Most candidates were able to correctly identify the section of the graph that showed uniform speed which was between R and S.

(ii) Faily done. Most candidates were able to score a mark for stating that 'the speed is not changing' but lost a mark for not stating that 'the graph is a horizontal line'.

(c) Poorly done. Most candidates failed to define velocity but instead defined speed. Some of the responses which were not credit worthy were rate at which an object speed increase and the rate of change of direction. Some candidates used vague definitions like the rate at which the motion of an object changes. Motion is a generic term and should not be used alone to describe of define terms used. Centres are advised to emphasise the distinction between scalar and vector quantities.

Answer: **(a)** 8 m / s

10 **(a)** Fairly done. The candidates were to draw a line to show the distance that represents the wavelength. The line was to join any two successive points which are similar (in phase) in a wave. Some candidates just drew a straight line from the start to the end of the wave while some did not label the line as instructed by the task. Centres are advised to emphasise the importance of candidates following of instructions.

(b) **(i)** Well done. Most candidates correctly stated that reflected sound is echo, even though many of the candidates gave the wrong spelling such as *eco* or *echoe*. Some candidates gave response such as frequency and incident.

(ii) The item was fairly done, since some candidates stated that sound travels faster in air than in solids. It appears they were confusing the concept of diffusion and that of speed of sound in different media.

(c) (i) Well done. Most candidates were able to recall transverse waves as another class of waves. There were some candidates who gave responses such as latitudes.

(ii) The question was poorly done. Most candidates included statements like 'a transverse wave occurs in liquids only' or 'particles move perpendicular to each other' or 'transverse waves are made up of crest and troughs. Other candidates described movement of waves instead of movement of particles such as 'waves move perpendicular to the direction of the wave'. The candidates failed to relate the vibration of particles to the movement of the wave.

11 (a) (i) Fairly done. The question was testing knowledge on magnetic properties of different materials. Steel is a hard magnetic material hence magnetism induced in it remains. While most candidates were aware that steel nail is magnetised, they failed to realise that it is the one which attracts iron fillings and not the other way round. Most candidates indicated that the iron fillings will attract the steel nail rather than the iron filling will move towards the steel nail or iron filings are attracted by the steel nail.

(ii) Fairly done. The steel nail remains magnetised after being in contact with permanent magnet. This is an indication of magnetism being induced in steel nail. Most candidates who got the question wrong gave responses that included magnetism, electromagnetism and steel loses magnetism slowly.

(b) (i) The item was poorly done. Some candidates appeared to have assumed that the iron nail was attached to the magnet, and the magnet was detached while holding the nail over the iron nails, hence answers like 'the iron filings were attracted and then fell off after a short time'. It appears they did not read the stem of the question to understand it well. The nail was detached from the magnet, and then held over the iron filings, hence with an iron nail no iron filling will be attracted. Centres should advise candidates to always read the whole stem to understand the task.

(ii) The item was poorly done. The question is tied to **(b)(i)**, therefore a wrong response to **(b)(i)** could not score at **(b)(ii)**. Since iron is a soft magnetic material, it loses its magnetism quickly and as such cannot pick the iron fillings like the steel nail. Some common wrong responses included statements like 'the iron nail and iron filling will repel each other because they are the same metal'.

(c) Faily done as most candidates were able to access one mark out of two. The common correct response was 'iron is used to make temporary magnets'. Candidates failed to note that the question was about uses of iron related to magnetic properties which included answers such as core of electromagnets, armature of electric bells, core of transformers, etc. Several candidates stated general use iron such as, iron is used to make iron nails. Some candidates stated general uses of magnet such to make compasses, refrigerator doors, etc.

12 **(a)** Well done. Most candidates were able to state the technique used as chromatography. There were a few candidates who gave responses such as filtration, distillation and chromatogram which were not correct. Centres should emphasise on the different separation techniques.

(b) Poorly done. Most candidates failed to score the first marking point, which required them to state that ink will dissolve in the solvent. Common wrong responses were ink will melt or mix with other substances, and it cannot be erased. A few candidates were able to score the second marking point by stating that ink will interfere with the results.

(c) **(i)** The item was well done as most candidates were able to identify mixture **Y** using information from the paper chromatography.

(ii) The item was well done since most candidates were able to identify mixture **U** as the substance that is found in both **X** and **Y**.

13 **(a)** Well done. Most candidates were able to plot the points correctly within half a small square to get the first two marks. The candidates had to join the plotted points using a smooth curve which a few failed to do, a few failed to join the points. The candidates were allowed to join all the points using a ruler (discrete data) hence most of them got the mark for joining the points correctly. It should be noted however that for graphs where the dependent variable varies with a change in the independent variable, candidates must sketch a smooth curve to join the points.

(b) **(i)** Poorly done. Most candidate failed to interpret the graph which indicated that there was a decrease in the number of deaths. Some candidates gave responses such as it decreases, the shape is going downward, trapezium, triangle.

(ii) The item was poorly done. Most candidates described the trend rather than give reason for the decline in the number of deaths. They provided responses such as 'the number of deaths decrease', 'decreasing shape'. The candidates should have provided answers that could be related to improved lifestyle which could be anyone from people started exercising, eating a balanced diet, medicine became available, etc.

(c) **(i)** Fairly done. It appears some candidates did not understand the question since instead of determining the two years that follow each other, they picked years that do not follow each other, others picked the number of deaths and subtracted on from the other (800-100). The answer depended on how the candidates sketched their graph with 1991 and 1992 being for smooth curve and 1995 and 1996 being for joined lines. Some candidates who drew a smooth curve, used the table to find the highest and lowest points instead of using their graphs as instructed in the question and they did not score.

(ii) The item was well done. The question expected candidates to find the difference in the number of deaths. Some candidates benefited from the error carried forward from the previous item. Some candidates failed to interpret the information in the table. They included thousands in the answer e.g. 210 000 instead of 210.

Answer: **(c) (ii)** 360 / 210

14 (a) (i) Well done. Most candidates were able to correctly record the volume as 43 cm^3. Some failed to understand the scale and gave the value as 40.3 cm^3.

(ii) Fairly done. The candidates were expected to state anything of the precautions from placing the measuring cylinder on a flat surface, taking readings from the bottom of the meniscus and placing eye perpendicular to point where reading is taken. Some of the responses were take the reading below the meniscus (instead of at the bottom of the meniscus), avoid the parallax error (without stating how).

(b) (i) Well done. Most candidates were able to correctly record the reading as 8.5 cm.

(ii) The item was well done though some candidates failed to round off correctly. Some candidates were multiplying the numbers instead of using the formula provided.

Answer: **(a) (i)** 43 cm^3 **(b) (i)** 8.5 cm **(ii)** 5.1 cm^2