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Examiners' report

BIOLOGY B (ADVANCING BIOLOGY)

H422
For first teaching in 2015

H422/01 Summer 2018 series

Version 1

Contents

Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates. The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

Where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report. A full copy of the question paper can be downloaded from OCR.

Paper H422/01 series overview

This was the second examination session for the new two year A Level specification. This examination paper was felt to be of an appropriate level of difficulty. It generated marks across the ability range and most candidates were able to provide responses to all parts.

There was no evidence to suggest that candidates struggled for time towards the end of the paper.

Mathematical skills were embedded within the multiple choice questions in section A and the longer responses required in section B. Overall candidates performed well on these questions.

However, some candidates were not able draw on experience gained from carrying out practical work and candidates did not always correctly interpret information, diagrams, or figures from graphs.

Section A overview

This section of the paper consisted of 30 multiple choice questions covering a range of topics across all modules of the Biology B specification. Some of the questions were straightforward recall whilst others required the use of mathematical and/or analytical skills; some questions needed more time than others.

Candidates should be aware that answers to multiple choice questions should be clearly written and if answers are changed and the intended response is unclear, the mark is not credited. In such cases one letter should be crossed out and the new answer written clearly.

The section below gives feedback on those multiple choice questions which caused the greatest difficulty to candidates.

Question 3

3 Which of the statements, **A** to **D**, is true of single nucleotide polymorphisms (SNPs)?

A All SNPs have four possible variations.

B Genetic recombination can generate a SNP.

C SNPs can influence banding patterns on a DNA fingerprint.

D SNPs occur in exons only.

Your answer ☐

[1]

Many candidates confused SNPs with VNTRs and hence selected option C.

Question 6

6 Meiosis II pauses in the secondary oocyte and is only completed if fertilisation occurs.

Which of the options, **A** to **D**, is a description of the **last** meiotic stage prior to fertilisation?

A Homologous chromosomes align to the equator of the oocyte.

B Homologous chromosomes migrate to opposite poles of the oocyte.

C Single chromosomes align to the equator of the oocyte.

D Sister chromatids migrate to opposite poles of the oocyte.

Your answer ☐

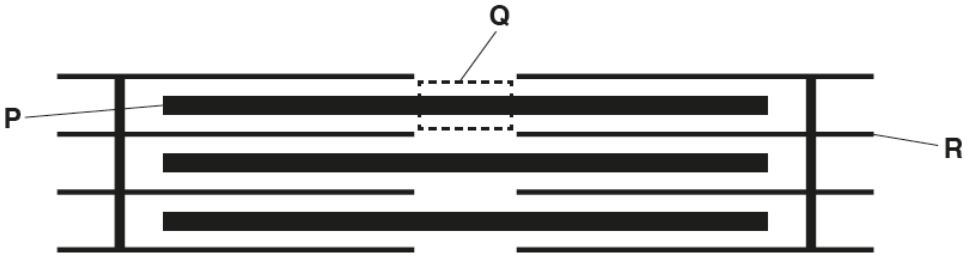
[1]

The level of recall demanded by this question proved problematic for many candidates. Despite the question asking about the completion of meiosis II, many candidates selected option A or B which referred to homologous chromosomes. The question was testing the knowledge that meiosis II is halted at metaphase II prior to fertilisation.

Question 12

12 The diagram below represents the ultrastructure of a single sarcomere in skeletal muscle.

Three features of the sarcomere are labelled **P**, **Q** and **R**.



Here are three statements about the diagram:

1 During muscle contraction, **R** slides along **P**.

2 **P** is responsive to calcium ions.

3 **Q** is responsive to ATP molecules.

Which of the statements is/are correct?

A 1, 2 and 3 are correct

B Only 1 and 2 are correct

C Only 2 and 3 are correct

D Only 1 is correct

Your answer ☐

[1]

This proved to be a challenging question with a small proportion of candidates selecting the correct answer. The most common response was option B suggesting that candidates didn't recognise Q as an area where there would be overlap between actin and myosin during muscle contraction. It would therefore need to be responsive to ATP molecules.

Question 18

18 Scientists are producing a vaccine against a disease-causing bacterium.

The table below shows the locations and mutation rates of four proteins, **A** to **D**, in the bacterium.

	Protein location	Mutation rate (per amino acid)
A	cell membrane	2.1×10^{-4}
B	cell wall	4.3×10^{-4}
C	pilus	7.7×10^{-4}
D	ribosome	1.8×10^{-4}

Which of the proteins, **A** to **D**, is most suitable as the basis of a vaccine against this bacterium?

Your answer ☐

[1]

Candidates realised that a vaccine would be more useful against a protein with a low mutation rate. However, very few appreciated that the vaccine would only work if the protein were on the outside of the bacterial cell. The correct answer was therefore B.

Question 19

19 Which of the options, **A** to **D**, describes the type of gene mutation that causes Huntington's disease?

A change of nucleotide that affects the protein

B change of nucleotide that does not affect the protein

C deletion of nucleotides

D insertion of nucleotides

Your answer ☐

[1]

Huntingdon's disease is caused by insertion of many CAG repeats.

Question 20

20 Here are three statements about the *BRCA1* gene:

1 Women with mutations in *BRCA1* are at increased risk of breast cancer.

2 *BRCA1* mutations can be inherited by males.

3 *BRCA1* is a proto-oncogene.

Which of the statements is/are correct?

A 1, 2 and 3 are correct

B Only 1 and 2 are correct

C Only 2 and 3 are correct

D Only 1 is correct

Your answer ☐

[1]

Almost all candidates opted for either A or B. However, *BRCA1* is a tumor suppressor gene.

Question 21

21 Which of the statements, **A** to **D**, is true of epigenetics?

A Guanine is the most commonly methylated DNA base.

B Identical twins show identical epigenetics.

C Proteins cannot undergo epigenetic modification.

D Some epigenetic changes can be reversed.

Your answer ☐

[1]

Only the more able candidates were able to select D as the correct response.

Question 23

23 Here are three statements about the evolution of language:

1 Sequencing the genome of extinct human ancestors helps to indicate the origins of language.

2 The evolution of language will have been influenced by reproductive (mating) preferences.

3 The 'gossip' hypothesis relies on trust between animals for the acceptance of unfamiliar sounds.

Which of the statements is/are correct?

A 1, 2 and 3 are correct

B Only 1 and 2 are correct

C Only 2 and 3 are correct

D Only 1 is correct

Your answer ☐

[1]

Many candidates selected option A or C for this question. However, statement 3 here relates to the mother tongues theory of language evolution.

Question 27

27 A study was conducted to compare the effectiveness of two fertilisers, TomatoXL® and TomatoGro®, on the growth of tomato plants.

Twenty plants of similar height were divided randomly into two groups of ten. Each day, one group was fed with TomatoXL® and the other group with TomatoGro®.

After one month, the height of each tomato plant was measured and the results were analysed.

Which of the options, **A** to **D**, would be the appropriate statistical method to determine which fertiliser was the more effective?

A Chi squared test

B paired Student's t-test

C Spearman's rank correlation coefficient

D unpaired Student's t-test

Your answer ☐

[1]

The most common distractor here was B; the paired t-test. However, there are two different groups of plants in this experiment; in a paired test the same plants would be tested with the two treatments.

Question 29

29 DCPIP is a molecule that is used to measure the rate of the Hill reaction in isolated chloroplasts.

Which of the options, **A** to **D**, correctly describes DCPIP during the Hill reaction?

A it becomes oxidised

B it loses electrons

C it mimics NADP

D it turns from colourless to blue

Your answer ☐

[1]

This question tests knowledge of the practical demonstration of the Hill reaction during which DCPIP is reduced, turning from blue to colourless. DCPIP therefore mimics NADP.

Section B overview

Like last year, this section included questions on a range of topics. Many of the questions were highly structured with varying levels of demand within a topic area. This gave candidates the opportunity to pick up marks on subsections even when the topic area was highly challenging for them.

Candidate performance overview

Candidates who did well on this section generally did the following:

- Showed a good understanding of chromosome mutations and karyotype analysis.
- Clearly described the principles of homeostasis and temperature regulation.
- Performed well on questions requiring an understanding of practical procedures and experimental design.

Candidates who did less well on this section generally

- Had a good understanding of the development of medicines and the concept of a placebo use in drugs trials.
- Performed well on mathematical components including calculations of magnification, standard deviation, respiratory quotient and % efficiency.

Question 31 (a) (i)

31 A Robertsonian translocation is a type of chromosomal translocation in which the long arms of two chromosomes fuse together.

Fig. 31.1 shows this event occurring between chromosomes 14 and 21.

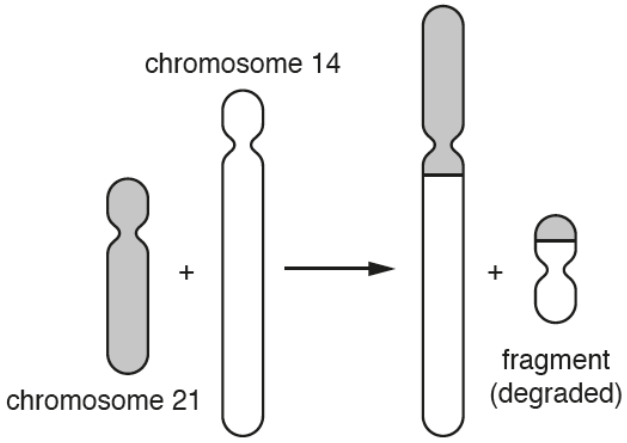


Fig. 31.1

An individual who inherits the translocated chromosome in Fig. 31.1 will either have Down's syndrome or be a carrier of the disorder.

A couple have a child. The mother is a carrier and the father is genetically normal. The genetic material with respect to chromosomes 14 and 21 in the somatic cells of the parents are shown in Fig. 31.2.

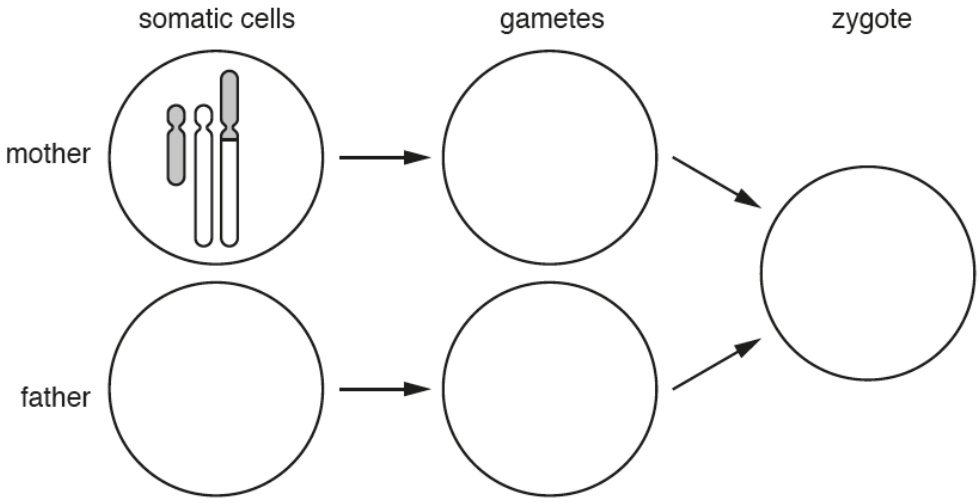


Fig. 31.2

(a) (i) With reference to Fig. 31.2, suggest why the mother does **not** have Down's syndrome.

.....

..... **[1]**

This question required candidates to know that Down's syndrome is a disorder caused by **extra** genetic material relating to chromosome 21. This can be when there are three distinct copies of chromosome 21(trisomy 21) or some extra material relating to chromosome 21. In this case the mother does not have any extra genetic material and therefore does not have Down's syndrome.

Question 31 (a) (ii)

(ii) The child is born with Down's syndrome.

Complete the diagram in Fig. 31.2 to show the genetic material with respect to chromosomes 14 and 21 in:

- the somatic cell of the father
- the gametes of the mother and father
- the zygote of the child.

[Answer on Fig. 31.2] **[4]**

Very few candidates were able to complete all four of the diagrams correctly. Many candidates were not able to identify which chromosomes would be present in the gamete of the mother but were credited with subsequent marks if they understood that the zygote would result from a combination of the two gametes. Candidates need to be careful when completing diagrams such as these to make sure that they include the relevant shading or annotation to distinguish the relevant chromosomes.

Exemplar 1

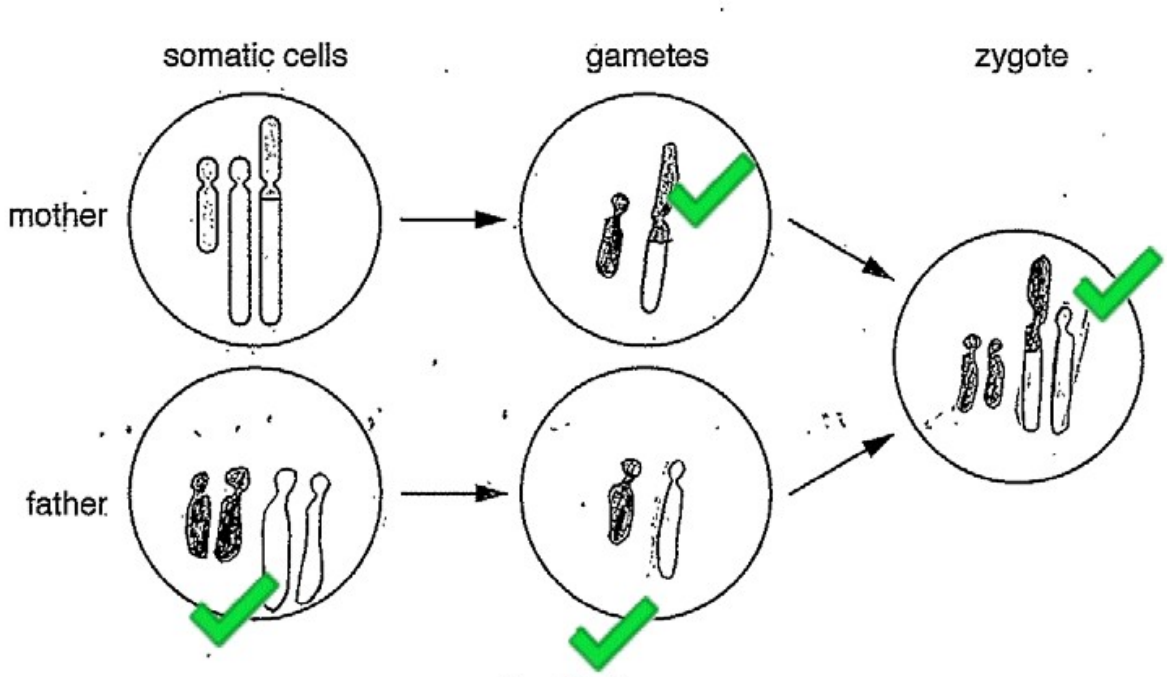


Fig. 31.2

In this response the candidate completed the diagrams correctly. The shape and shading of the chromosomes was clear and unambiguous.

Question 31 (b)

(b) Down's syndrome is more commonly caused by a genetic event that is distinct from that shown in Fig. 31.1.

State the name of this event **and** outline how it arises.

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.....

.....

.....

.....

..... **[3]**

Few candidates were able to recall non-disjunction, but the question also required a precise description of what might happen during meiosis to result in the formation of a zygote with three chromosomes 21s.

Exemplar 2

State the name of this event and outline how it arises.

Non - disjunction

homologous pair of chromosome fail to seperate during anaphase I or sister chromatids chromatids fail to seperate during anaphase II

As a rsult, one gamete will have a diploid number.

The multing zygote has 3 copies of chromosome 21 **[3]**

This response recalls the name and gives a succinct and clear description of events of meiosis. There was an implication that all the chromosomes failed to separate making the gamete diploid and therefore this response would not have been credited with the idea of the gamete having an extra chromosome 21. However, it gained the maximum of three marking points in the first four lines.

Question 31 (c) (i)

(c) A sample of cells can be collected from a fetus to test for genetic disorders such as cystic fibrosis.

(i) Chorionic villus sampling (CVS) and amniocentesis are two methods of obtaining fetal cells.

State the **source** of fetal cells that are obtained through these methods.

CVS .....

Amniocentesis .....

[1]

Question 31 (c) (ii)

(ii) The sample of fetal cells can be used to produce a karyotype for genetic analysis.

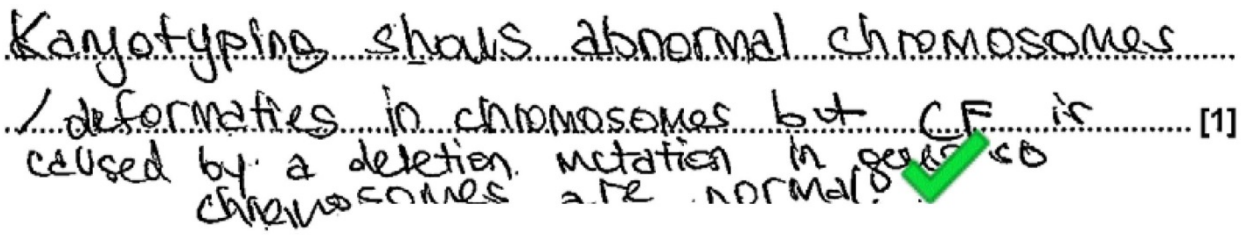
Explain why karyotyping can **not** be used to detect cystic fibrosis.

.....

..... **[1]**

Most candidates were able to identify the source of fetal cells. In order to explain why karyotyping cannot be used to test for CF, candidates had to have some knowledge of the cause of CF.

Exemplar 3



[1]

This response describes the cause of CF. Any idea of CF being a gene mutation would be sufficient. The response also explains why it would not be picked up on a karyotype.

Question 32 (a)

32 Homeostatic mechanisms require hormones, such as thyroxine, to maintain a stable internal environment.

(a) Iodine is required to produce thyroxine.

Explain why a deficiency in iodine could cause weight gain.

.....

..... **[1]**

Some candidates correctly identified that less thyroxine would lower the metabolic rate and cause weight gain.

Question 32 (b) (i)

(b) The release of thyroxine is regulated by negative feedback and involves two other hormones, as shown in Fig. 32.

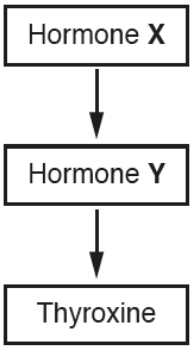


Fig. 32

(i) Identify hormones **X** and **Y**.

X .....

Y .....

[2]

Only the more able candidates were able to recall TRH and thyrotropin/TSH.

Question 32 (b) (ii)

(ii) Describe the **general** features of a negative feedback mechanism.

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..... [3]

This question proved demanding, with most candidates using specific examples to illustrate their points rather than referring to the generalisations.

Exemplar 4

A negative feedback mechanism is made up of a set point, around which the condition is meant to remain, receptors which detect any deviations from the set point, a communication system and effectors which produces changes to return the value to within the acceptible range of the set point. [3]

This answer covers all the marking points,

Question 32 (c)

(c) Core body temperature is maintained between 36.5 °C and 37.5 °C.

Describe **and** explain **two** physiological mechanisms that would be initiated following a decrease in core body temperature.

1 .....

.....

2 .....

.....

[2]

Although this question was accessible to most candidates there were a number of common misconceptions that examiners came across during marking. Candidates should note the key points listed below.

Key points

- Vasoconstriction does not happen in capillaries.
- Vasoconstriction does not prevent heat loss – only reduce it.
- Shivering can generate heat, but candidates should be careful not to imply the production of energy since energy cannot be created.

Question 32 (d)

(d) Doctors often take temperature measurements from the skin surface, inside the ear or inside the mouth.

Suggest why the ear provides a more accurate measurement of body temperature than the skin surface.

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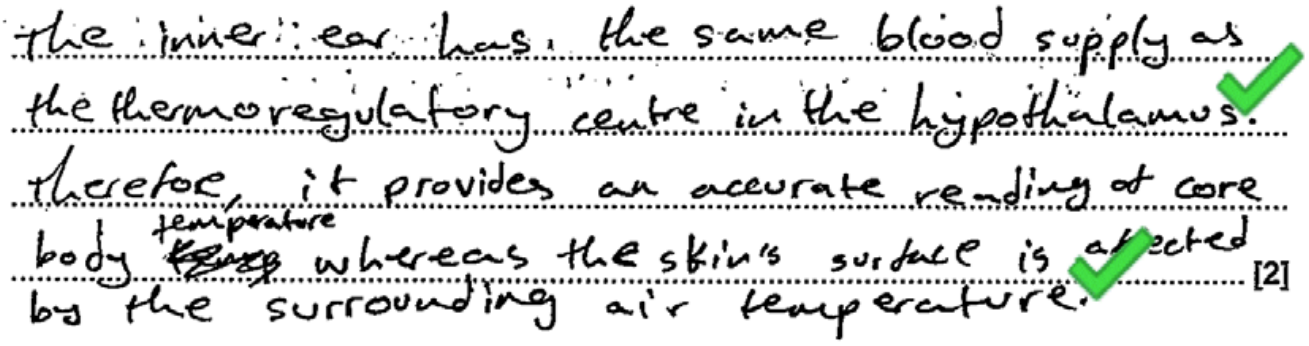
..... **[2]**

Candidates found it difficult to explain this is a succinct way although many achieved one mark for the idea of the ear being closest to the thermoregulatory centre.

Exemplar 5



This response covers the idea above plus it continues to explain why the skin surface temperature would not give an accurate representation of body temperature.

Question 33 (a)

33 (a) Complete the paragraph below about ecosystems using the most appropriate terms.

Natural change in the community of an ecosystem over time is known as succession. In this process, biodiversity increases until a ..... community is reached. Human activities such as agriculture and forestry can prevent formation of this type of community, instead forming a ..... This process is known as ..... succession.

[3]

Question 33 (b)

(b) Pioneer species are the first to colonise an ecosystem.

How do pioneer species promote future biodiversity?

.....

..... **[1]**

Question 33 (c)

(c) Fig. 33 shows a region of coastal land, stretching from tide to woodland.

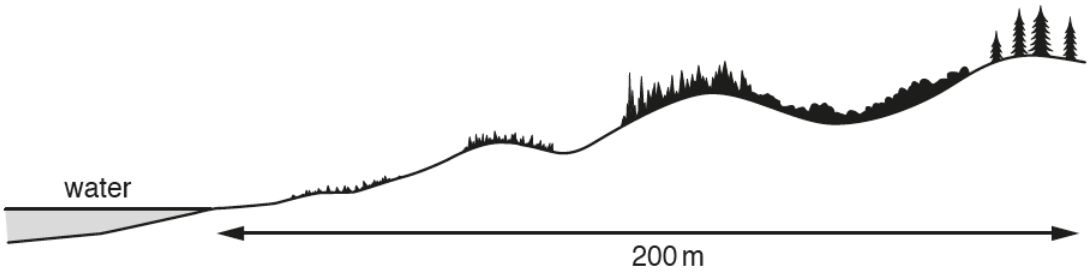


Fig. 33

Outline a sampling method that could be used to investigate succession in this region.

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..... **[3]**

Parts 33a-33c were answered well by most candidates but in 33c, a few candidates lost marks by first suggesting that they would use a transect and then contradicting themselves to say they would use random sampling. It is important for candidates to decide on one answer as examiners cannot select a correct answer from a series of answers.

Question 33 (d) (ii)

(ii) In snail farming, snails are fed lettuce leaves.

The efficiency of energy transfer from the lettuce leaves to stored biomass energy in snails is **greater** than that from maize to stored biomass energy in cattle. Suggest why.

.....

..... **[1]**

Examiners were looking for the idea that snails are ectothermic animals, unlike cattle who lose a lot of energy through heat.

Question 33 (e)

(e)* Cattle are ruminant animals. The stomach of a ruminant animal contains specialised chambers.

Explain how the ruminant stomach digests food to produce important molecules.

Your answer should refer to **named** chambers of the stomach.

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.....

..... **[6]**

More than 70% of candidates scored level 1 or lower on q33e. It was clear that this was a less familiar topic area for many. Candidates were sometimes able to correctly recall names of the stomach chambers, but few were able to correctly assign structure to function. Higher level answers included a description of the different micro-organisms involved in digestion and focused on the products of digestion of cellulose, the conversion of saccharides to fatty acids and the digestion of bacterial proteins into amino acids. Description of regurgitation were common but apart from this distinction many answers were simply variations on the human digestive system and had little relevance to the ruminant stomach.

Exemplar 6

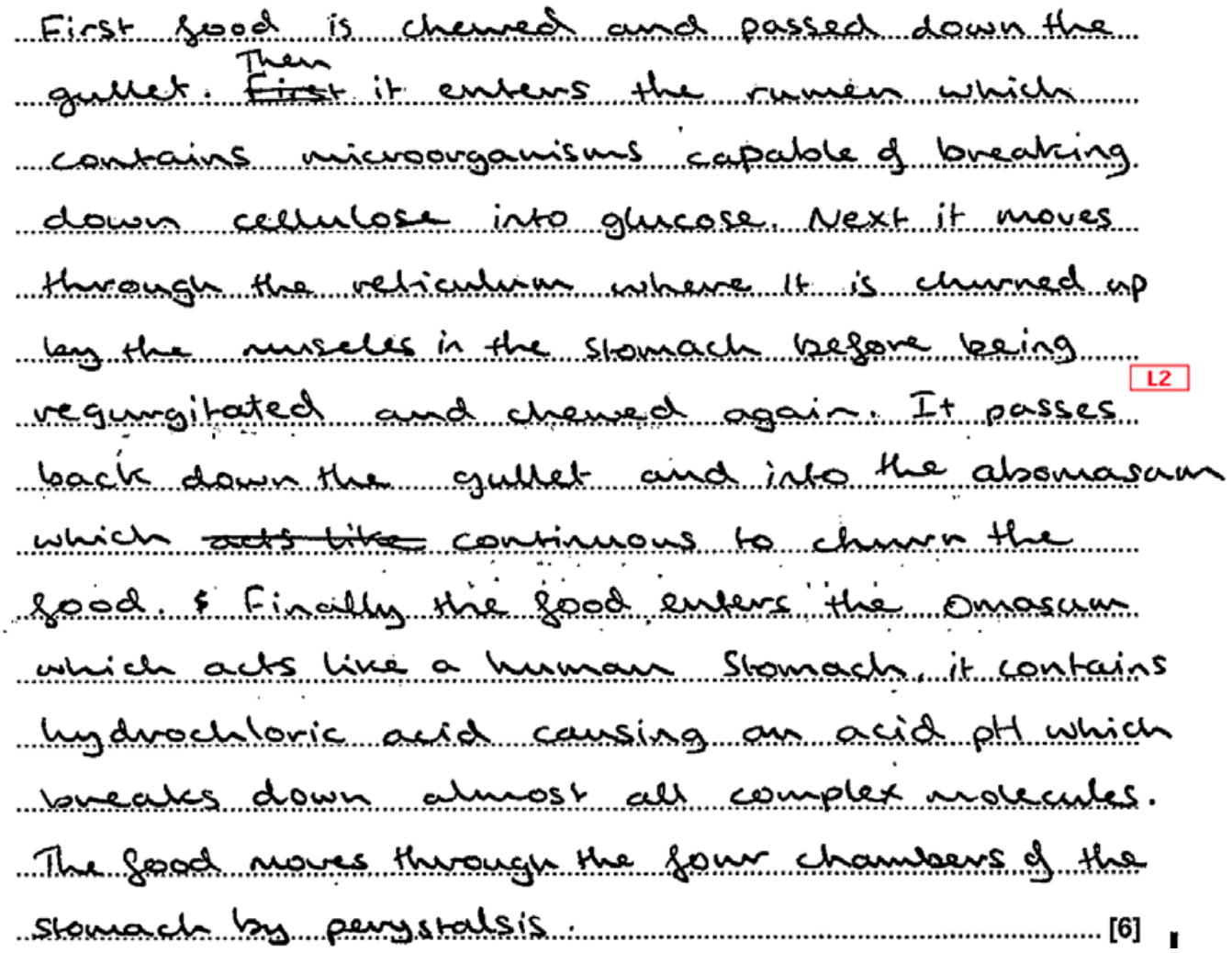
-The food first enters the reticulum where ~~the~~ it is mixed with enzymes to initiate digestion. ~~the break down of~~

-It then passes to the Rumen. Here the food is mixed with a large bacterial colony which contains the cellulase enzyme which the ruminant doesn't have. The food is often then regurgitated to be chewed again to make its digestion. The presence of the bacteria allow previously undigestible cellulose to be broken down into mono and disaccharides. They also provide a source of protein and fixed nitrogen. Small aliquots of the bacterial colony are regularly taken and passed to the next chamber; the abomasum. Here, the bacteria and food are mixed with acid and proteases to break them down. They are then passed to the omasum where they are broken down further. (continued on back) [6]

L3 A

This answer has several features of a level 3 answer.

Exemplar 7



First food is chewed and passed down the gullet. Then ~~First~~ it enters the rumen which contains microorganisms capable of breaking down cellulose into glucose. Next it moves through the reticulum where it is churned up by the muscles in the stomach before being regurgitated and chewed again. It passes back down the gullet and into the abomasum which ~~acts like~~ continues to churn the food. & Finally the food enters the omasum which acts like a human stomach, it contains hydrochloric acid causing an acid pH which breaks down almost all complex molecules. The food moves through the four chambers of the stomach by peristalsis. [6]

L2

This Level 2 answer mentions the stomach chambers and outlines the roles, although there is some confusion between abomasum and omasum. There is little detail and apart from the digestion of cellulose there is no reference to the production of important molecules.

Question 34 (c)

(c)* A respirometer is used to investigate the rate of respiration.

Fig. 34 shows the setup of a respirometer with two chambers.

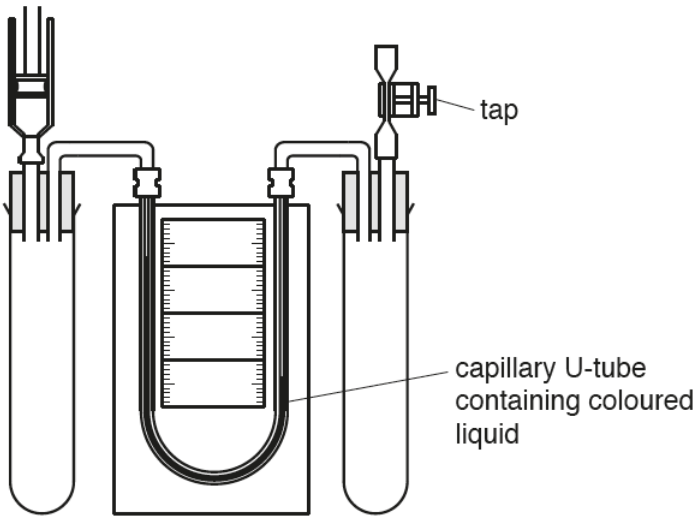


Fig. 34

Discuss how the respirometer in Fig. 34 can be used to calculate the RQ of germinating peas.

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.....

..... **[6]**

It is important for candidates to remember that Paper 1 includes a significant percentage of AO2 and AO3 assessment objectives which include the application of knowledge and understanding of scientific ideas in a practical context.

Candidates found this question demanding and lower ability candidates demonstrated a poor understanding of the respirometer and how it would be used to measure respiration rates. A few candidates thought that the syringe was for pumping oxygen into the apparatus and some thought it was for measuring the gas released. In both cases candidates did not understand the crucial point that to measure oxygen uptake, the carbon dioxide released must be absorbed. The other important consideration in this experiment is that variables must be very carefully controlled as fluctuations in temperature and pressure alter the position of the dye in the manometer tube. In a double chambered respirometer such as this, one side should contain the organism and the other should contain the same volume of glass beads as a control. This compensates for any changes in pressure that would move the manometer fluid. The question asked how the apparatus could be used so candidates were expected to include reference to setting up, controlling variables and how measurements would be taken. Only the most able candidates were able to extend this into a discussion of how the RQ could be calculated.

Exemplar 8

Germinating peas respire aerobically from the breakdown of starch contained within their seeds this means that if the germinating seeds are placed in one tube, atop a solution of ~~conc~~ KOH to absorb the CO_2 produced, then the volume of oxygen produced would equal the displacement of the liquid in the capillary tube would equal the volume of oxygen uptake. Similarly in another identical apparatus set, the volume of CO_2 production can be calculated, if the KOH is not present by calculating the difference in volume of O_2 uptake CO_2 produced (positive liquid displacement) - (O_2 uptake), these two values can be used to calculate RQ = $\left(\frac{VCO_2}{VO_2}\right)$

A L2

[6]

This answer has several features of a Level 2 response

It describes the principles on which the respirometer works but makes no mention of the second tube. The answer refers to carrying out the experiment twice but makes little comment about controlling external variables such as temperature.

Exemplar 9

In the first tube we fill NaOH at the bottom (as this absorbs CO_2) and we place the germinating peas in a cage just above the NaOH. As the germinating peas respire O_2 is taken in so the fluid in the manometer rises. In the other test tube we place NaOH at the bottom and something to resemble the germinating peas (like glass beads which are the same weight). This makes RQ more valid as any changes in the movement of the manometer fluid not due to O_2 production (eg: like pressure or temperature will be cancelled out.

L3

This part answer has much more focus on the practical details of setting up the apparatus and incorporates the idea of the second test tube as a control. This moves the answer up to a level 3. Further detail on how the RQ would be calculated were included in the rest of the response.

Question 35 (b)

(b) Drugs must be evaluated for safety and effectiveness in clinical trials before they are licensed for the treatment of specific diseases.

A clinical trial was conducted to investigate the effect of a drug on blood glucose levels in patients with type 2 diabetes. Blood glucose levels can be monitored by measuring glycosylated (or glycated) haemoglobin (HbA_{1C}).

- Sixty patients with untreated type 2 diabetes were recruited.
- HbA_{1C} levels were measured before the trial began.
- The patients were divided into two groups.
- One group received daily drug treatment and the other group received a daily placebo.
- After three months, HbA_{1C} levels were measured and changes from pre-trial measurements were calculated.

Fig. 35 shows the results of the trial. The boxes show the mean change in HbA_{1C} levels after three months and the error bars represent standard deviations.

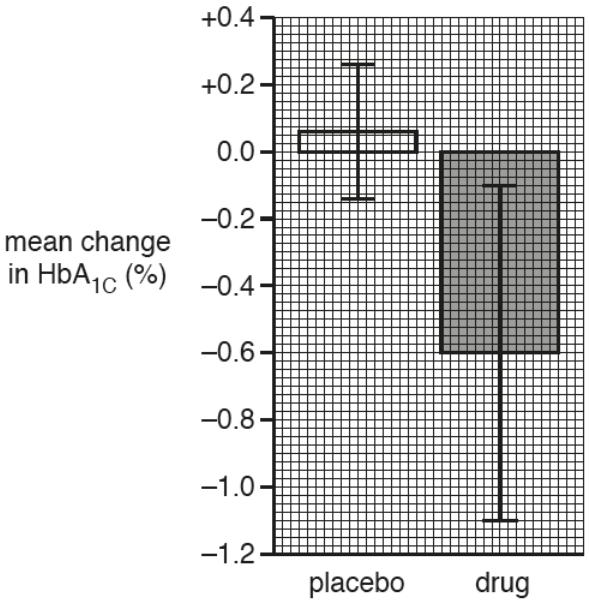

Fig. 35

Question 35 (b) (iii)

(iii) Compare the results shown in Fig. 35 for the group receiving the placebo with the group receiving the drug.

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..... **[3]**

Some candidates interpreted the boxes on the graph as the range of data rather than the mean change in glycosylated haemoglobin. Few candidates achieved the full three marks.

Exemplar 10

The placebo had much narrower results than the actual drug with the mean average reading a positive change in HbA. The actual drug saw a decrease in ~~a~~ HbA change with results being far more spread out than the placebo as shown by the much larger error bars. The decrease is by 0·6 in the drug and the placebo has less than a 0·1 increase [3]

A comparative answer including the scale and direction of differences and a statement about the more varied data in the treatment group.

Question 36 (a)

36 Water is a polar molecule. Molecules of water are attracted to each other.

Fig. 36.1 shows the structure of a water molecule.

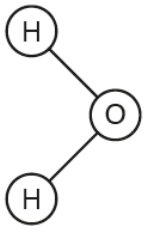

Fig. 36.1

(a) Draw a **second** water molecule on Fig. 36.1, in the position it might take up beside the first water molecule.

Your drawing should show:

- the bond(s) between the two molecules
- the name of each bond
- the charges on each atom.

[Answer on Fig. 36.1] **[3]**

Many candidates were able to gain full marks in this question although it was noted that many drawings showed more than one extra water molecule. This was not penalised on this occasion, but candidates should read instructions carefully, particularly when in bold type.

Question 36 (b) (i)

(b) Water is required for many metabolic reactions, such as the hydrolysis of starch.

The enzyme that catalyses this reaction, amylase, is commonly used in the food industry. It is produced in large-scale bacterial cultures.

A group of students investigated the amylase activity of five bacterial species.

The bacterial species were treated using the following method:

1. Prepare three nutrient agar plates containing 1% potato starch.
2. Soak five paper discs with cultures of five bacterial species, **A** to **E**.
3. Allow excess liquid to drain from the paper discs and then place onto an agar plate.
4. Repeat steps 1–3 for the other two agar plates.
5. Incubate the agar plates at 25 °C for 3 days.
6. After 3 days, flood the agar plates with reagent **X**.
7. Measure the diameter of any clear zones around the paper discs using a ruler.

Fig. 36.2 shows an agar plate at the end of the investigation.

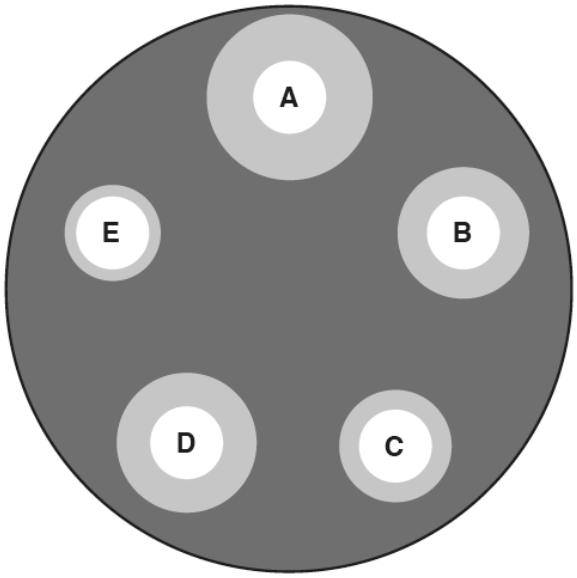

Fig. 36.2

(i) State the **precise** name of the chemical bond in starch that is hydrolysed by amylase.

..... **[1]**

Very few candidates identified the precise name of the chemical bond which is the alpha 1-4 glycosidic bond.

Question 36 (b) (ii)

(ii) Reagent **X** was used to indicate the presence or absence of starch in the agar plates.

State the name of this reagent **and** its colour in the presence of starch.

Name .....

Colour .....

[1]

Very few candidates correctly identified iodine-KI reagent.

Question 36 (b) (iv)

(iv) The investigation did not include any control experiment.

Suggest **one** control experiment that could have been included in this investigation **and** explain its importance.

.....

.....

.....

..... **[2]**

Many candidates correctly identified a control – most commonly this was soaking the paper discs in water. However, few candidates developed the answer to explain how this would show the colour change was caused by the amylase rather than the moisture on the disc.

Question 36 (b) (v)

(v) Suggest **one** other way in which the method could be changed to improve the validity of the conclusions.

.....

..... **[1]**

There was confusion between validity and reliability here and many candidates suggested repeating the experiment. An experiment is valid if it measures what it is supposed to be measuring. In this case the experiment is comparing the amylase activity of different bacterial species by soaking paper discs in bacterial cultures. Having specific concentrations of bacteria in each culture would make it more valid.

Question 37 (a)

37 The process of gas exchange involves several specialised cell types.

Fig. 37.1 shows a human bronchiole and surrounding alveoli under a light microscope. Two cell types are labelled **R** and **S**.

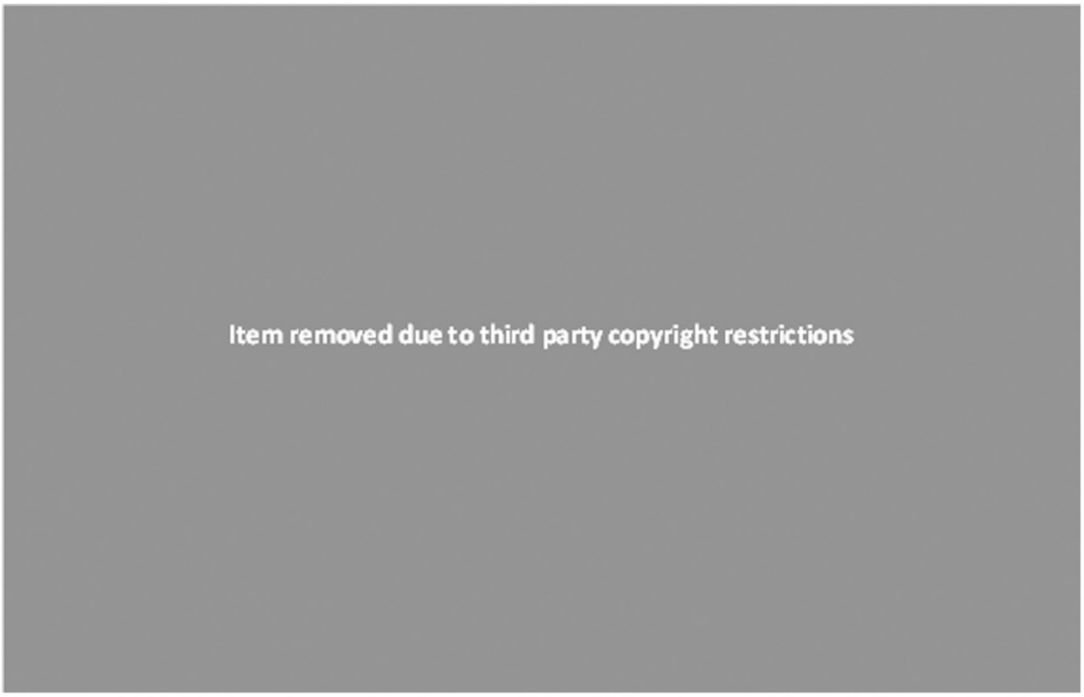

Fig. 37.1

(a) Complete the table below by inserting, for each cell type:

- the **precise** name
- **one** role in gas exchange.

Cell type	Name	Role
R	.....	.....
	.....	.....
	.....	.....
S	.....	.....
	.....	.....
	.....	.....

[4]

Many candidates were able to identify the squamous epithelial cell and describe the role. The smooth muscle cell proved more difficult to identify and for those who could there was some confusion about the role of this cell type. Some candidates incorrectly linked the contraction of smooth muscle to the regular ventilation process.

Question 37 (b) (i)

(b) A health campaign was launched to help people to give up cigarette smoking.

Fig. 37.2 is a graph that featured in the campaign.

Lung function is represented as a percentage of FEV_1 at the age of 25 years.

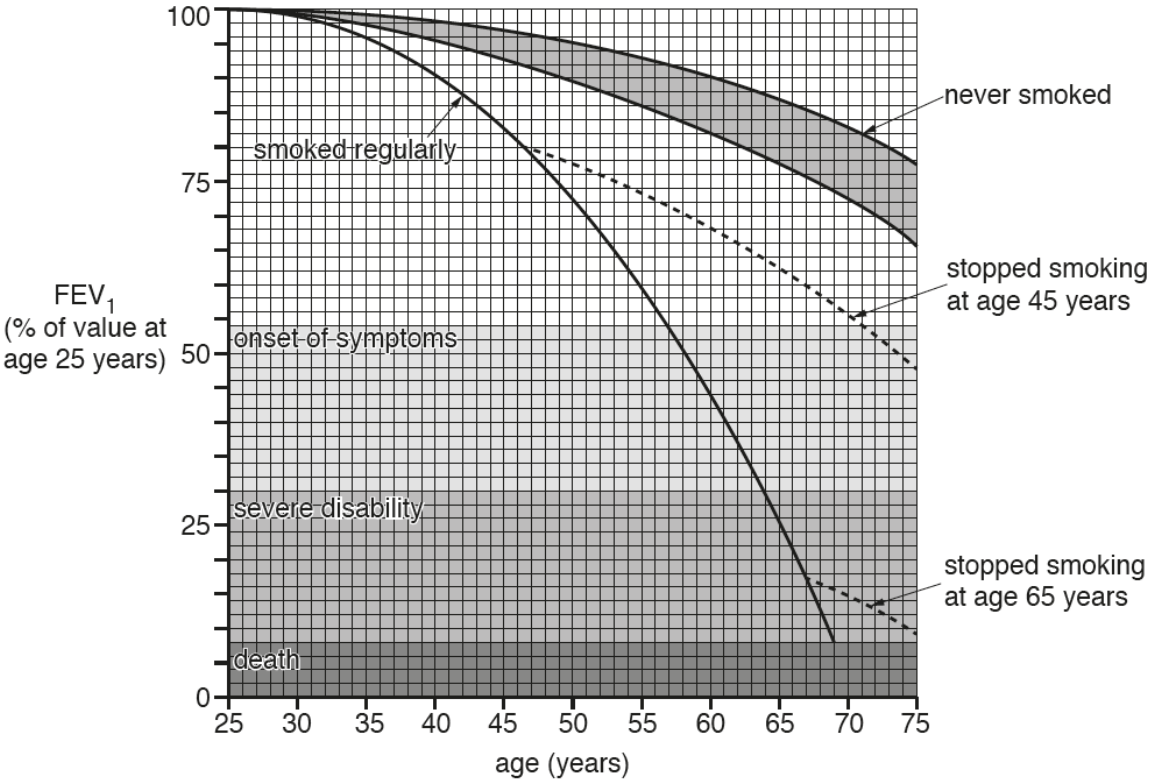

Fig. 37.2

(i) The health campaign claimed that giving up cigarette smoking improves quality of life and prevents smoking-related death.

Evaluate this claim using the data from the graph in Fig. 37.2.

.....

.....

.....

.....

.....

.....

.....

..... **[3]**

Although candidates were asked to evaluate a claim made about giving up smoking, many candidates wrote at length about non-smokers and regular smokers. This made their answers too long and often caused them to miss out on marks. Candidates should remember to quote data to support their answer in an evaluation question.

Exemplar 11

(i) The health campaign claimed that giving up cigarette smoking improves quality of life and prevents smoking-related death.

Evaluate this claim using the data from the graph in Fig. 37.2.

For people that stopped smoking aged 45 there onset of symptoms reduced from age 57 to 71 which is a big increase, however people that stopped age 65, have already gone past symptoms disability so it just gives them around 7 years more to live. The earlier you stop the more it improves quality of life.

This candidate starts their answer clearly by referring to the two different ages that smokers could give up and gains the full marks in just six lines of text.

Question 37 (b) (ii)

(ii) During the campaign, doctors warned that the graph in Fig. 37.2 could not accurately predict the lung function of **individual** cigarette smokers over time.

Suggest **two** reasons why.

1 .....

.....

2 .....

.....

[2]

Most candidates scored at least one mark here. Candidates stated correctly that individuals would have different starting FEV values but did not appreciate that the graph shows the change in FEV as a % of the FEV at 25 and so this would have been taken into account.

Exemplar 12

1 Some people have different sized lungs therefore have as smaller FEV, 100% value anyway.

2 each individual will have smoked different numbers of cigarettes per day and how often they smoke.

[2]

This response demonstrates the error described above as well as one correct response.

Question 37 (c)

(c) Cigarette smoking increases an individual's risk of a heart attack.

A heart attack can lead to respiratory arrest.

Describe how expired air resuscitation is performed to manage an adult in respiratory arrest.

.....

.....

.....

.....

.....

.....

.....

..... **[3]**

Several candidates described CPR rather than expired air resuscitation.

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