AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.5.3.5

The use of hormones to treat infertility (HT only)

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**4**
Available paper years	**2021–2024**

Using this booklet

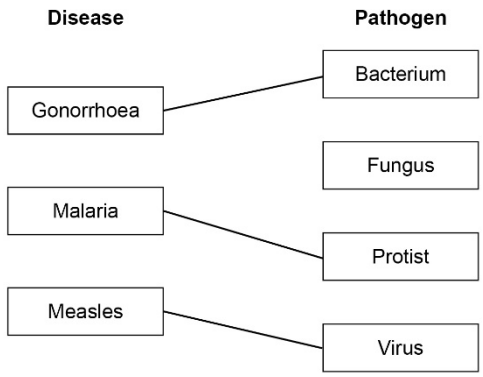
1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 01 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	 do **not** accept more than one line from a box on the left		1 1 1	AO1 4.3.1.1 4.3.1.2 4.3.1.3 4.3.1.5
04.2	reduces breeding / reproduction (in mosquitos) (so) fewer mosquitos to bite people **or** (so) fewer mosquitos to pass on pathogen / protist	allow fewer (mosquito) eggs fertilised allow no offspring produced (by sterile mosquitos) allow (so) less likely to be bitten by mosquitos ignore fewer mosquitos to pass on malaria / disease	1 1	AO2 4.3.1.1 4.3.1.5
04.3	electron microscope	ignore microscope unqualified ignore scanning / transmission do **not** accept light microscope	1	AO2 4.1.1.5 4.3.1.2

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 01 · Mark scheme

04.4	(fungal spore) (16 μm =) 1.6×10^{-5} m **or** (virus) (2.5×10^{-7} m =) 0.25 μm $\frac{1.6 \times 10^{-5}}{2.5 \times 10^{-7}}$ **or** $\frac{16}{0.25}$ (=) 64	 allow $\frac{0.000\,016}{0.000\,000\,25}$ allow incorrect attempt at conversion or not converted value for length correctly substituted allow a correctly calculated value using an incorrectly or not converted value for length allow **1** mark **only** for $\frac{16}{2.5} = 6.4$	1 1 1	AO2 4.1.1.1 4.1.1.5 4.3.1.2 4.3.1.4

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 01 · Mark scheme

04.5		the idea of less is only needed once		
	discolouration in leaves **or** less chlorophyll in leaves	ignore mosaic pattern of leaves unqualified	1	AO1
	(so) reduced photosynthesis	allow less light absorbed	1	AO1
	(so) less glucose produced so less amino acids / proteins / cellulose made	allow (so) less glucose so less energy for synthesis of chemicals **or** allow (so) less glucose for respiration (so) less energy transferred for growth	1	AO2 4.3.1.2 4.4.1.1 4.4.1.2 4.4.1.3 4.4.2.1
Total			**12**	

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 01 · Mark scheme

November 2021 | 8464/B/1H | Original Q4

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 02 · Mark scheme

June 2022 | 8464/B/2H | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	negative feedback (control)	ignore homeostasis	1	AO2 4.5.3.6 4.5.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2	A = glucagon B = insulin	both required in correct order correct or phonetic spelling only	1	AO2 4.5.3.2

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 02 · Mark scheme

June 2022 | 8464/B/2H | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3 **indirect marking** **view with 5.2**	(when blood glucose concentration is high after a meal) insulin / B is secreted (by the pancreas) causing glucose to enter cells		1	AO2
	(glucose is) converted to glycogen in the liver / muscle (cells for storage)		1	AO1
	(this causes) blood glucose concentration to return to normal so insulin / B secretion slows / stops / decreases		1	AO2
	when blood glucose concentration is low glucagon / A is secreted (by the pancreas)		1	AO2
	(which causes) breakdown of glycogen in the liver (into glucose)	allow (which causes) breakdown of glycogen in the muscle (cells)	1	AO1
	(this causes) blood glucose concentration to return to normal so glucagon / A secretion slows / stops / decreases		1	AO2 4.5.3.2

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 02 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.4	FSH causes (several) ova / eggs to mature (in the ovary)	allow singular ovum / egg allow follicle for ovary	1	AO2 4.5.3.3 4.5.3.5
	(then) LH causes ovulation **or** LH causes release of the ova / eggs	allow singular ovum / egg	1	
	so more eggs / ova present therefore higher probability / chance of fertilisation **or** so more eggs / ova present therefore higher probability / chance of sperm fusing with an egg		1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.5	collection of (mature) egg(s) from the ovary	allow follicle for ovary	1	AO1 4.5.3.5
	(which are) fertilised (in the laboratory)	do **not** accept if in fallopian tube allow egg and sperm fuse	1	
	develop into embryo(s) (in the laboratory)	allow develop / divide into small balls of cells (in the laboratory) do **not** accept foetus	1	
	embryo(s) inserted into uterus / womb		1	

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 02 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.6	any **three** from: • meiosis forms sperm **and** mitosis forms liver (cells) • two cell divisions to form sperm **and** one cell division to form liver (cells) • four genetically different sperm cells **and** two genetically identical liver cells • sperm cells have 23 chromosomes **and** liver cells have 46 chromosomes	ignore reproduction max **2** marks if reference to sperm cells dividing allow four genetically different cells formed from meiosis **and** two genetically identical cells formed from mitosis allow sperm cells have 23 chromosomes **and** liver cells have 23 pairs of chromosomes allow haploid (sperm) and diploid (liver cells)	3	AO1 4.6.1.2 4.1.2.2

Total Question 5		**18**

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 03 · Mark scheme

June 2023 | 8464/B/2H | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	FSH and LH		1	AO1 4.5.3.5 4.5.3.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2	ovary / ovaries		1	AO1 4.5.3.5 4.5.3.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3	any **one** from: • to be able to select / check egg(s) • to select / check sperm sample for live sperm • to see injection / guiding sperm to egg(s) • to see if the egg has been fertilised • to select / check (developing) embryo(s)	allow to count the eggs (collected) allow to grade the embryos ignore egg(s) / embryo(s) / sperm are too small to be seen without a microscope unqualified	1	AO3 4.5.3.5

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 03 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.4	(hormones / FSH / LH used in IVF) cause an increase in progesterone **and** oestrogen		1	AO1
	progesterone / oestrogen maintain uterus lining	allow oestrogen / progesterone causes thickening of uterus lining	1	AO1
	(uterus) lining is prepared / ready for embryo to be inserted / implanted	allow the (uterus) lining is prepared / ready for implantation	1	AO2 4.5.3.5 4.5.3.3

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 03 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.5	$\left(\frac{135}{450}\right) = 0.3$ 3 : 7 alternative method 1: $\frac{135}{45} : \frac{315}{45}$ **or** $\frac{135}{45} : \frac{450 - 135}{45}$ (1) 3 : 7 (1) alternative method 2: evidence of dividing both sides of 135 : 315 by 5 **and** by 9 (1) 3 : 7 (1)	allow $\left(\frac{450 - 135}{450}\right) = 0.7$ if **no** other mark awarded allow **1** mark for 27 : 63 **or** 9 : 21 **or** 15 : 35 **or** 3 : 10	1 1	AO2 4.5.3.5

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 03 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.6	any **one** from: • age • obesity / fitness / BMI / diet • (the original) reason for infertility • allow the number of eggs collected • the number of embryos implanted	 allow menopause allow body mass **/** weight allow a named reason for infertility / miscarriage eg endometriosis ignore infertility unqualified	1	AO3 4.5.3.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.7	any **two** from: • (physical / emotional) stress of operations • success rate is low • multiple births are a risk to mother **/** baby • (ethical concern regarding) embryos are created but not used	 allow physical / emotional stress of named part of IVF process eg infection from surgery ignore side effects unqualified allow (may) take many months / years (to be successful) allow may need several / many attempts allow multiple births more likely ignore unethical unqualified	2	AO3 4.5.3.5

Total Question 5	11

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 04 · Mark scheme

June 2024 | 8464/B/2H | Original Q3

Question 3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	parents of child with AKU / disorder do not have AKU / disorder **or** child(ren) with AKU / disorder have parents who do not	allow **A** and **B** do not have AKU, but child / **D** does (have AKU) allow **F** and **G** do not have AKU, but child / children / **K** / **L** does (have AKU) allow child(ren) with AKU / disorder have parents who are carriers	1	AO3 4.6.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.2	G		1	AO2 4.6.1.4

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 04 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.3	(parental gametes) (female) **a and a** (male) **A and a**	allow **1** mark for **a a and A a** parental gametes reversed	1 1	AO2 AO2
	offspring correctly derived **Aa Aa aa aa**	allow correctly derived offspring from incorrect parental gametes	1	AO2
	offspring phenotype correctly derived **Aa** = no AKU **aa** = AKU	allow correctly derived phenotypes from incorrect parental gametes or incorrect offspring genotypes allow inclusion of **AA** = no AKU, if their cross derives this genotype ignore reference to carriers	1	AO2
	(probability =) 0.5	allow 50% **or** ½ **or** 1 in 2 **or** 1:1 **or** 50:50 probability must match offspring genotype do **not** accept 1:2 **or** 50/50	1	AO3 4.6.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.4	(mutation causes) incorrect sequence of amino acids		1	AO2 4.6.1.3
	(which) causes the enzyme to be a different shape	allow (which) causes the active site to be a different shape allow which means the enzyme and substrate cannot bind ignore the enzyme is denatured do **not** accept no enzyme produced	1	

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 04 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.5	FSH **and** LH given / injected (into female) to stimulate maturation of egg(s)		1	AO1 4.5.3.3 4.5.3.5
	(collected) egg(s) are fertilised (in laboratory)	allow (collected) egg(s) fused with sperm (in laboratory) allow sperm is injected into egg (in laboratory)	1	
	fertilised egg undergoes mitosis	allow cell(s) undergo mitosis allow fertilised egg divides / develops to form embryo	1	
	(one or two) embryo(s) inserted into uterus / womb **or** (one or two) ball(s) of cells inserted into uterus / womb		1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.6	any **two** from: • risk to embryo	allow risk of miscarriage do **not** accept risk to embryo due to radiation	2	AO3 4.6.1.5
	• risk to female / mother • stressful process • may lead to termination of the pregnancy	allow may lead to destruction of the embryo		
	• (high) cost (of the screening process) • embryo cannot give consent	allow idea of increased prejudice against other people with (inherited) disorders ignore references to religion / ethics		

Total Question 3	15

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 01 · Examiner comments November 2021 | 8464/B/1H | Original Q4

Question 4 (standard, standard/high and high demand)

This question was about diseases in humans and plants caused by pathogens. More than half of the students scored full marks for linking human diseases to the type of pathogen that each was caused by. Almost half scored 1 mark for saying that releasing sterile mosquitos into the environment would decrease reproduction in mosquitos. Few went on to explain how this would reduce the spread of malaria. As is often the case in questions about communicable diseases, students did not make it clear that reducing the spread of a disease is due to reducing the transfer of pathogens.

A third of students said an electron microscope would be used to view the virus; most just said microscope, which was insufficient. About a third of students knew what type of calculation was required to work out how many times longer the spore was compared to the virus. Few students realised that both measurements had to be converted to the same unit, and errors were seen when unit conversions were attempted. No student gave a full explanation why plants infected with TMV grow slowly. Some said there would be less photosynthesis or that the leaves would have less chlorophyll.

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 02 · Examiner comments

June 2022 | 8464/B/2H | Original Q5

Question 5 (standard, standard/high & high demand)

05.1 A quarter of students could identify this type of hormonal control as negative feedback. Common incorrect answers were homeostasis, diabetes and endocrine.

05.2 39% of students could interpret the figure to identify hormone A and hormone B as glucagon and insulin respectively. Both hormones were allowed to be spelt phonetically, however hybrid terms that indicated a possible confusion between glucagon and other terms such as glycogen, glucose and glycerol where not acceptable. Examples such as glycogen were seen.

Common mistakes were to confuse glucagon and insulin, or to name other hormones.

05.3 Explanations usually started with the first marking point but it was equally acceptable to start at the fourth marking point. The most frequently seen mark was for release of glucagon when blood glucose concentration is low.

Confusion was common between the terms glucagon and glycogen, plus glycerol was also regularly seen.

The third and sixth marking points were very challenging. These required an understanding of how negative feedback causes the reduction in the release of each hormone.

A fifth of students scored either three or four marks.

05.4 40% of students could identify the roles of FSH and LH. Few students gained the third marking point, to fully explain why the probability of pregnancy would be greater following FSH and LH injections.

05.5 Most students knew that IVF involves fertilisation in laboratory conditions. Some inaccuracies of language were seen, such as sperm and egg mix, with no reference to or description of fertilisation, and eggs being inserted into the body, with no reference to uterus or womb.

05.6 Students found this question challenging, with 4% achieving full marks. Confusion between meiosis and mitosis was common. Responses generally lacked the detail required for the points on the mark scheme. Some students only described one process or the other, rather than describing differences.

Responses could not gain full marks if there was an implication that sperm cells go through meiosis.

The third marking point was sometimes attempted, but not expressed clearly, such as four sperm cells are made that are different, but the two liver cells are the same. Reference to *genetically* different or *genetically* identical was required.

4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 03 · Examiner comments

June 2023 | 8464/B/2H | Original Q5

Question 5 (Standard, Standard/High and High demand)

05.1 Nearly two-thirds of students could identify the hormones that are given to women having IVF treatment.

05.2 Most students could state ovary / ovaries as the target organ of the hormones used in IVF.

05.3 Students found this question challenging. Many simply stated that egg / sperm are too small to see without a microscope, which was insufficient to answer the question.

Students could refer to any relevant stage in the process of IVF, as illustrated by the list of bullet points on the mark scheme.

One common misconception was that microscopes are needed to view hormones.

05.4 Students could write follicle stimulating hormone for FSH and luteinising hormone for LH. Students gave lots of detail on the general roles of FSH and LH that are irrelevant to the question.

Many students did not answer the question in terms of IVF, but could still gain marks.

In marking point 2, 'womb' was taken as equivalent to 'uterus'. 'Building up' (of the uterus lining) is equivalent to 'thickening'. Endometrium was an acceptable alternative to lining (that is beyond the specification). Note that the list rule was applied if additional hormones were referred to here.

For marking point 3, 'the lining is prepared for pregnancy' was common, but insufficient, because this did not add to the information given in the question.

05.5 The correct answer without any working received full marks. If the correct answer was given with working then examiners checked the working to see that it is logical before awarding full marks.

The correct answer did not have to be on the answer line but anything that has been given on the final answer line will always take precedence. Students sometimes displayed the alternative method 2 in a slightly different way, such as dividing both sides of the ratio by 5, then by 3 and then by 3 again.

There was a fall back mark if students did not complete their simplification of the ratio but got part way through the process. Alternatively, the fall back mark was given for a ratio of 3:10, which indicated students misinterpreted the table but simplified that ratio correctly.

If the ratio was given the incorrect way round, no mark was awarded.

05.6 The most commonly awarded marks were for age (bullet point 1) or for smoking, obesity or alcohol as named reasons for infertility (bullet point 2). There were many insufficient vague references to health or lifestyle which were not creditworthy. Other commonly seen insufficient answers included hormone levels or the levels of named hormones such as FSH as well as statements about the condition or health of the uterus.

Bullet points 4 or 5 were very rarely awarded. When students did attempt these marking points they often referred to the amount of eggs without suggesting it was the number collected that was important or suggesting it was eggs or fertilised eggs that were implanted rather than embryos.

05.7 For bullet point 1 there were many vague statements about stress, it being emotional or harmful without saying how or why it was stressful, emotional or potentially harmful. References to the risks of surgery were seen very rarely.

Bullet point 2 was the most commonly awarded marking point although many students were not awarded this marking point as they made vague references to the idea that it might not work rather than emphasising the low success rate.

There were many references to multiple births or twins, which were not creditworthy as they failed to qualify the reference with the idea of the risks associated with multiple births or that IVF made multiple births more likely.

0 5 . 7 Give **two** arguments against the use of IVF treatment.

Do **not** refer to cost or to religion in your answer.

[2 marks]

1 It ~~tom~~ can be emotionally and physically stressful for the women

2 IVF treatment doesn't always work

This response did not gain any marks. The first reference is too vague to award bullet point 1. The reference to IVF treatment not always working could apply to any conception and therefore needed to be qualified, such as 'low chance of working'. Some students quoted their ratio from question **05.5** to support this response.

There were many references to the process of IVF being unethical or unnatural without saying what made it unethical but on many occasions students went further and explained it was unethical as it might lead to the destruction of a potential life.

Other insufficient answers referred to the embryo or egg not being able to consent or the misconception that IVF allows parents to choose characteristics or will lead to designer babies.

Answer 04 · Examiner comments

Question 3 (standard, standard/high & high demand)

03.1 There was only 1 mark available here and for this to be awarded it was essential that reference was made to both parents (without the disorder) and their children (who have the disorder). A common misconception was for students to base their descriptions on the (low) frequency of AKU within the family.

Students should be aware that using 'it' will be treated in terms of how the question is phrased, unless the student clarifies what they mean by 'it'. Please see page 4 of the mark scheme for more guidance on the use of 'it'. Here, 'it' unqualified was considered equivalent to 'AKU'.

No evidence could be obtained from C and D as parents. Answers which described this part of the family tree as evidence gained no credit as it is incorrect biology, even if a student went on to make further correct points.

Examples of answers which were too vague to match the mark scheme included:

- 'D has AKU and this means that his parents are heterozygous' ('Heterozygous' does not clearly suggest that a recessive AKU allele is present but the parents do not have AKU)
- 'A and B don't have AKU but future generations do' ('Future generations' is too vague)
- 'AKU skips generations'.

03.2 Fewer than 50% of students could identify which person is definitely heterozygous for AKU. More students selected the incorrect answer of 'D'.

03.3 Most students were able to correctly identify the gametes for both parents, although where one of these marks was not awarded it was often because students presumed that the female with AKU had the genotype AA rather than aa and therefore were struggling to tell the difference between recessive and dominant despite being told AKU was recessive earlier in the question.

Almost all students were able to derive the offspring in the Punnett square and were awarded marking point 3.

For marking point 4, very few students attempted to identify the offspring phenotypes, and when there was an attempt at this, the mark wasn't awarded if only the phenotype 'having AKU' was indicated rather than the phenotype for both having AKU and not having AKU. Many students drew circles around offspring genotypes in the belief that this would be sufficient to suggest a phenotype of 'having AKU', but this was not creditworthy. Another frequent mistake was referring to the phenotype of Aa offspring as being 'heterozygous' or 'a carrier'. Although not incorrect descriptions, these are not actual phenotypes.

Giving the probability of having AKU was, in the majority of cases, done correctly and was usually given as a percentage or a fraction. This was very rarely given as a ratio. When incorrect gametes were given, a common mistake made when working out the probability was that offspring with Aa or AA would have AKU.

Other, more occasional, errors included giving an incorrect probability, such as 1:2 or 50/50 or 50 and using symbols other than those (A and a) directed in the question.

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4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 04 · Examiner comments June 2024 | 8464/B/2H | Original Q3

It was noted that quite a few students changed their minds when answering this question and made alterations to the gametes and genotypes they originally opted for. If students do this, they must make sure that the changes are unambiguous and, if necessary, rewrite their choices. It was sometimes very difficult for examiners to decide what the student intended to be marked.

0 3 . 3 A female who has AKU and a male who is heterozygous for AKU plan to have a child.

Determine the probability that the child will have AKU.

You should:

- complete **Figure 4**
- identify the phenotype of each offspring genotype
- use the symbols:

  A = dominant allele

  a = recessive allele.

[5 marks]

Figure 4

Male \ Female	a	a
A	Aa	Aa
a	aa	aa

2:2 ratio

Probability that the child will have AKU = 50%

In a typical response, as shown above, students gave the correct parental gametes, and derived offspring genotypes correctly. The student has not indicated the phenotype of each offspring genotype, therefore marking point 4 was not awarded. However, the probability is acceptable, so 4 marks could be awarded.

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4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 04 · Examiner comments June 2024 | 8464/B/2H | Original Q3

03.4 Students found this question difficult with very few gaining both marks. They struggled to make appropriate connections between the mutation and the non-functioning enzyme.

Answers were often too general and repetitive of information given in the question to be adding any value, such as 'a mutation could change the cell's DNA to stop producing functioning enzymes' or 'if the gene has changed it will mean that the enzyme has changed'.

In other cases, students clung to the familiarity of terms in the question but created their own, inappropriate, narratives around them. So, 'mutation' triggered reference to 'random changes', incidence in the family tree, links to cancer and 'uncontrollable cell division'; 'protein' prompted discussions of ribosomes, protein digestion by protease, proteins being needed for growth and repair; 'enzyme' opened the way to details of denaturation.

Misconceptions were quite frequently seen, such as:

- 'DNA is made of amino acids'
- 'DNA a protein'
- 'genes make amino acids that code for a protein'
- 'the enzyme is 'mutated'
- 'the enzyme changes shape and can then no longer fit the active site'.

Overall, marking point 2 was seen far more frequently than marking point 1. Students clearly felt more comfortable discussing why enzymes might not be functioning rather than the reason behind this (the immediate consequence of the mutation).

03.5 This question was set at high demand. It closely reflects the specification content for the use of hormones in the treatment of infertility. Answers were often confused and poorly sequenced. Appreciation of the distinctions between 'egg', 'fertilised egg' and 'embryo' and between 'ovary' and 'uterus' was often lacking.

For the first mark, students had to refer only to FSH and LH being given to the female to stimulate maturation of eggs. Incorrect answers included ideas of the hormones 'increasing the chances of fertilisation', 'making the eggs more fertile', 'strengthening the eggs'. Students occasionally suggested that FSH and LH production was stimulated through treatment rather than the hormones being given directly. No credit was given for this.

The second marking point was the most commonly awarded mark. Credit was not given, however, for vague references such as the eggs and sperm were 'combined' or 'joined together'. The term 'fertilisation'/'fusion' was required or a suitable description of sperm being injected into eggs (ICSI). No mark was given when the student described fertilisation 'in the woman'.

Very few students achieved marking point 3. Words that were too vague such as 'growing'/'forming'/'turning into' were used instead. Mention of 'mitosis' was exceptionally rare. No credit was given if it was implied that embryo development only happened at a later stage within the uterus.

For the fourth mark, many students did not state that the embryo was inserted into the uterus. Answers which said that the embryo was 'put back into the woman' were insufficient. Reference to anything other than the 'embryo' or the 'ball of cells' at this stage, such as 'fertilised egg'/'baby', was incorrect. Some students wrongly suggested that the embryos were inserted into ovaries.

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4.5.3.5 The use of hormones to treat infertility (HT only)

Answer 04 · Examiner comments June 2024 | 8464/B/2H | Original Q3

03.6 This was generally well answered. The most commonly awarded marks were for bullet point 4 and bullet point 5, as students clearly understood the high cost of the process and that it might lead to parents choosing to terminate their pregnancy. Some students attempted bullet point 1 but did not understand the process and wrote about the embryo being harmed due to the radiation used in the process, which was incorrect.

Some students simply wrote 'ethics' without giving details on why some people might think this and there were often references to 'designer babies', which was incorrect. Some students appeared to be talking about IVF, such as 'not always successful', with some confusion about what embryo screening involves.

Some students described ideas of prejudice against people with inherited disorders. This was described in a variety of ways and was creditworthy.