



GCSE

Additional Science A

General Certificate of Secondary Education A218/02

Unit 4: Ideas in Context (Higher Tier)

Mark Scheme for June 2010

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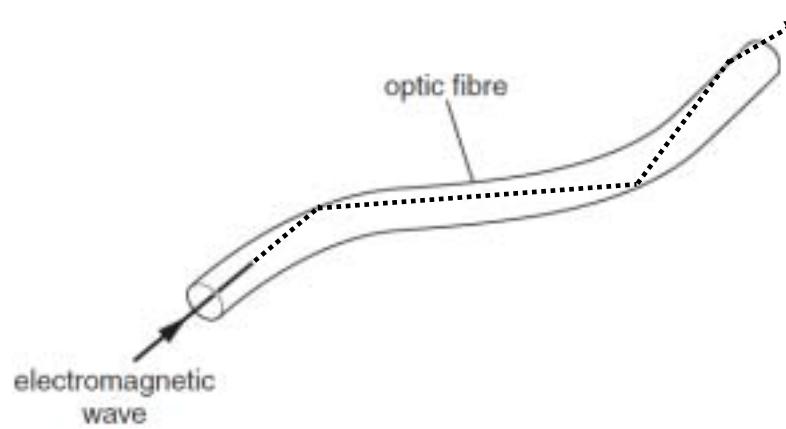
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| Question | | | Expected Answers | Marks | Additional Guidance |
|----------|---|-----|--|-------|---|
| 1 | a | i | not <u>absorbed</u> (by atmosphere) (1) | [1] | reject not absorbed by ionosphere accept can reflect off ionosphere |
| | | ii | microwaves (1) can go through <u>ionosphere</u> / radio waves cannot go through <u>ionosphere</u> (1) | [2] | mark independently accept microwaves not stopped / not absorbed / not blocked / not prevented / not reflected / ORA accept ionosphere prevents transmission (of radio waves) ignore atmosphere ignore references to speed |
| | | iii | idea of reflection (1) | [1] | ignore conduction |
| | b | | any four from: (signals pick up) noise/interference/distortion; when signal is amplified noise is also amplified; digital signals only have two values/0s and 1s/on and off/binary / analogue signals have many values; noise can be removed from digital signal; noise cannot be removed from analogue signal; digital signals carry more information (per second); | [4] | no diagram of a wave = max 3 marks mark the text or labels - these over-ride the diagram allow each marking point from the diagram if maximum marks are not scored from text reject 'digital signals do not pick up noise' ignore references to 'bits' allow cleaned up / restored / regenerated accept 'it is more difficult to remove noise from an analogue signal' ignore references to decoding |

| Question | | | Expected Answers | Marks | Additional Guidance | | |
|----------|---|--|--|-------|--|--|--|
| 1 | b | | continued | | <p>eg analogue</p> <p>original signal</p> <p>weak signal with noise</p> <p>amplified signal with noise</p> | | |
| | c | | idea of reflection (1) signal travels further / signals travel different distances / some of signal absorbed idea (1) | [2] | ignore time difference between arrival of signals (in the Q) | | |
| | d | | $300\ 000\ 000 \div 3\ 000\ 000\ 000$ OR $\lambda = v \div f$ (1) 0.1 (1) | [2] | correct numerical answer gains both marks | | |

| Question | | Gd | Expected Answers | Marks | Additional Guidance |
|----------|---|----|---|-------------|--|
| 1 | e | B | visually straight lines (not curves) no gaps reflection at the edge / boundary with <u>no more than 4</u> reflections in the optic fibre | [1] |  <p>electromagnetic wave</p> <p>Light must stay inside the tube and touch the edges at each reflection. Must have all points for the mark</p> |
| | | | Total | [13] | |

| Question | | | Expected Answers | | | | Marks | Additional Guidance | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|--------------|--------------|---|-------|---|--------------|---------|-----------------------|--|---|--|---------------------|--|--|---|---------------------------|--|--|---|------------------------------|--|--|---|-----------------------------------|---|--|--|---------------------------|--|--|---|-----|--|
| 2 | a | i | <table border="1"> <thead> <tr> <th>stage</th><th>only mitosis</th><th>only meiosis</th><th>neither</th></tr> </thead> <tbody> <tr> <td>1 Fertility drugs ...</td><td></td><td>✓</td><td></td></tr> <tr> <td>2 Egg cells are ...</td><td></td><td></td><td>✓</td></tr> <tr> <td>3 Sperm ... incubated ...</td><td></td><td></td><td>✓</td></tr> <tr> <td>4 A sperm ... fertilises ...</td><td></td><td></td><td>✓</td></tr> <tr> <td>5 ... fertilised egg (zygote) ...</td><td>✓</td><td></td><td></td></tr> <tr> <td>6 ...embryo is placed ...</td><td></td><td></td><td>✓</td></tr> </tbody> </table> | stage | only mitosis | only meiosis | neither | 1 Fertility drugs ... | | ✓ | | 2 Egg cells are ... | | | ✓ | 3 Sperm ... incubated ... | | | ✓ | 4 A sperm ... fertilises ... | | | ✓ | 5 ... fertilised egg (zygote) ... | ✓ | | | 6 ...embryo is placed ... | | | ✓ | [2] | correct mitosis column = 1 mark Correct meiosis column = 1 mark ignore third column |
| stage | only mitosis | only meiosis | neither | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 Fertility drugs ... | | ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 Egg cells are ... | | | ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 Sperm ... incubated ... | | | ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 A sperm ... fertilises ... | | | ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 ... fertilised egg (zygote) ... | ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 ...embryo is placed ... | | | ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ii | <p>similarity: (egg and) sperm / gametes involved (1)</p> <p>difference: (IVF) happens in Petri dish / outside the body / does not involve intercourse (1)</p> | [2] | ignore 'both form a zygote' ORA ignore 'is not natural' | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | b | | correct answer 8350 scores (2) uses 80 in any calculation (1) | [2] | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | c | i | contain identical genes / genetic code / DNA / chromosomes (2) idea of identical cell / organism / animal (1) | [2] | accept 'the same' or 'copy' | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Question | | | Expected Answers | Marks | Additional Guidance |
|--------------|---|-----|--|-------|---|
| 2 | c | ii | any two from: unspecialised cells are all the same / not differentiated / can become any type of cell / specialised cells have specific functions or jobs / grow into specific types of body cell; specialised cells produce specific proteins / types of tissue; specialised cells have <u>some</u> inactive / active genes; | [2] | accept example eg kidney cell etc accept particular / different as alternatives to specific ignore unspecialised cells make any type of protein / tissue idea of some genes on and some are off is important eg 'only the genes to make a particular protein are switched on' ignore unspecialised cells have all genes on / all genes off; |
| | | iii | any three from: each gene codes for one protein; proteins are built up from amino acids; (DNA contains) four bases / names or letters A, T, C and G (adenine, thymine, cytosine and guanine); which always pair up in the same way / A to T and C to G; bases are in a sequence / specific order; mRNA carries information from the DNA; 3 bases / triplet of bases / a codon codes for one amino acid; (protein synthesis) happens at ribosomes; | [3] | ignore U / uracil ignore '3 bases MAKE an amino acid' |
| Total | | | [13] | | |

| Question | | Expected Answers | Marks | Additional Guidance |
|----------|---|---|-----------------------|---|
| 3 | a | <p>first mark: copper oxide / copper carbonate (1)</p> <p>any three marks from: add excess (solid) / too much (solid) idea; when reaction stops; filter off (the solid); evaporate/ leave to crystallise; dry in an oven/desiccator/ dry with paper; QWC: one mark for correct spelling, punctuation and grammar in the first two lines</p> | <p>[4]</p> <p>[1]</p> | <p>reject copper accept - copper hydroxide if more than one substance is suggested, all must be correct to score ignore – <u>metal</u> oxide, hydroxide, carbonate</p> <p>ignore references to excess acid 'after the experiment' not enough</p> <p>allow filter in context of either excess solid or crystals formed</p> <p>allow any idea of time taken for crystals to form</p> <p>ignore any references to 'heating' alone</p> <p>max one mistake in the first 2 lines - ignore words of more than two syllables must have at least two lines to score QWC</p> |

| Question | | | Expected Answers | | Marks | Additional Guidance |
|----------|----|--|--|--|-------|---|
| 3 | b | | MgSO ₄ (1) hydrogen and H ₂ (1) magnesium sulfate + Hydrogen MgSO ₄ + H ₂ | | | [2] one mark for MgSO ₄ one mark for both Hydrogen and H ₂ if incorrect balancing is given do not allow second mark do not accept H ₂ etc do not accept Mg SO ₄ – O must be half height of S or bigger by eye |
| c | i | | a gas given off /carbon dioxide given off (1) | | | [1] accept hydrogen given off |
| | ii | | any three from: <u>rate</u> decreases / reaction slows down (in first 60 seconds); reaction stops after <u>60s</u> / no more gas given off after <u>60s</u> / no mass change after <u>60s</u> ; acid is being used up / acid concentration falls; when <u>all</u> acid is used up reaction stops; | | | [3] ignore answers that refer to amount of gas do not allow reactants / chemicals / magnesium carbonate used up reject volume of acid decreases |
| d | i | | 60 (1) | | | |
| | ii | | (percentage / actual) yield too high (1) weight of the crystals is higher than it should be / water has a mass (1) | | | [2] allow 'it is higher than it should be' - 'it' = yield reject <u>theoretical</u> yield is higher ignore 'crystals contain water' alone |
| | | | Total | | | [14] |

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