

Question Number	Answer	Additional Comments	Mark
2(a)	<p>(QWC– Spelling of technical terms must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none"> 1. sperm cell {fuses / eq} with egg cell (<i>membrane</i>) ; 2. reference to {<i>cortical granules / vesicles / lysosomes</i>} ; 3. idea of (cortical granules) {moving towards / fusing with } egg cell (surface) <i>membrane</i> ; 4. reference to <i>exocytosis</i> (of <i>cortical granules / vesicles / lysosomes</i>) ; 5. idea of contents (of <i>cortical granules</i>) {secreted /released into jelly layer / eq} OR reference to <i>cortical reaction</i> ; 6. idea of { hardening / thickening / eq } of { <i>zona pellucida</i> / jelly layer } OR formation of <i>fertilisation membrane</i> ; 7. reference to change in charge across egg cell membrane ; 	<p>QWC emphasis is on spelling of technical terms</p> <ol style="list-style-type: none"> 1. NOT the fusion of the nuclei 4. NOT for description of acrosome reaction 5. ACCEPT enzymes / chemicals NOT released into ovum 6. ACCEPT fertiliZation 	(4)

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2(b)	<ol style="list-style-type: none"> reference to both { independent / random } assortment and { crossing-over/chiasma(ta) } ; independent assortment gives rise to {new / different / eq} combinations of (paternal and maternal) chromosomes ; crossing over involves swapping of {sections / eq} of {chromatids /chromosomes} ; 	<p>3. NOT swapping genes ACCEPT new combinations of alleles (on a chromosome) / recombinants</p>	(2)

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2(c)(i)	<ol style="list-style-type: none"> Idea that temperature is a controlled variable e.g. constant temperature removes this variable, so temperature does not affect {results / length of pollen tube} ; idea that (pollen tube) { growth / enzymes / proteins /eq } affected by temperature ; idea that at this temperature { enzymes / proteins } will not be denatured / pollen not destroyed at this temperature / 22.5°C optimum temperature ; idea that the investigation is valid ; 	<p>1. ACCEPT the idea of only changing one variable and keeping all the others constant – or so that only methylpurine affecting pollen tubes</p> <p>NOT 'a control'</p> <p>4. NOT reliable IGNORE fair test, accurate, precise</p>	(2)

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2(c) (ii)	<p>1. idea of { no significant / small / 1mm / eq } increase in { mean length / growth } up to 0.0001 mol dm⁻³ ;</p> <p>2. idea of negative correlation described e.g. {decrease in length of / shorter/ reduced growth of} pollen tubes as concentration increased OR over stated range from 0.0001 to 0.01 ;</p> <p>3. idea of greatest { change / drop / eq } between 0.0010 and 0.0100 mol dm⁻³ / eq ;</p> <p>4. credit correct manipulation of the data to illustrate decrease ;</p>	<p>IGNORE units.</p> <p>2. ACCEPT reference to decreases at specific concentrations of methylpurine IGNORE negative correlation unqualified</p> <p>3. NOT references to rapid decrease.</p> <p>4. Some examples given below</p> <table><tr><th>Conc. change</th><th>Difference (mm)</th><th>% all decreases</th></tr><tr><td>0.0000 – 0.0100 – mp2</td><td>(94-28) 66</td><td>70 / 70.2 %</td></tr><tr><td>0.0001 – 0.0100</td><td>(95-28) 67</td><td>71 / 70.5 %</td></tr><tr><td>0.0001 – 0.0010</td><td>(95-90) 5</td><td>5 / 5.3 %</td></tr><tr><td>0.0010 – 0.0100 – mp3</td><td>(90-28) 62</td><td>69 / 68.9 %</td></tr></table>	Conc. change	Difference (mm)	% all decreases	0.0000 – 0.0100 – mp2	(94-28) 66	70 / 70.2 %	0.0001 – 0.0100	(95-28) 67	71 / 70.5 %	0.0001 – 0.0010	(95-90) 5	5 / 5.3 %	0.0010 – 0.0100 – mp3	(90-28) 62	69 / 68.9 %	(3)
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2(c) (iii)	<ol style="list-style-type: none"> { less / no } transcription / idea of inhibition of RNA polymerase ; { less / no } { translation / protein synthesis/ protein made / eq } ; idea that protein needed for (pollen tube) growth e.g. less protein leads to reduced growth (of pollen tubes) ; 	<p>2 & 3 ACCEPT reference to enzyme instead of protein</p> <p>IGNORE repair</p>	(2)