

Question Number	Answer	Additional guidance	Mark
4(a)	1. idea of increasing cell number ; 2. idea of replacing { damaged / dead } cells OR idea of repairing (damaged) tissue ; 3. to produce <u>genetically</u> identical cells ;	1. ACCEPT 'production of new cells' and cells divide multiply or replicate 2. NOT growth or repair of cells	(2)

Question Number	Answer	Additional guidance	Mark
4(b)(i)	Stage 2. { hydrochloric / acetic / ethanoic } AND { macerate / soften / separate / break up / eq } ; Stage 3. Toluidine (blue) / orcein / Feulgen / Schiff's (reagent) ; Stage 4. Slide AND { coverslip / cover slide } ;	Stage 2. ACCEPT HCl, ACCEPT break down Stage 3. ACCEPT ethanoic /acetic / proprionic orcein. ACCEPT unambiguous spellings that couldn't be anything other than the name of a stain	(3)

Question Number	Answer	Additional guidance	Mark
4(b)(ii)	1. { safety goggles / safety glasses / gloves } when handling { acid / stain } 2. care (with scalpel) when cutting root tip 3. care with slide when squashing root tip ;	IGNORE lab coats protecting clothes	(1)

Question Number	Answer	Additional guidance	Mark
4(c)	(QWC– Spelling of technical terms must be correct and the answer must be organised in a logical sequence) 1. idea of chemical stimulus e.g. signal protein, growth substance ; 2. idea of some genes { active / inactive / eq } ; 3. idea of transcription of active genes ; 4. mRNA translated / { polypeptide / protein } made / eq ; 5. idea of cell { structure / function } determined / cell modified e.g. lignin synthesised ;	QWC emphasis is logical sequence 1. ACCEPT hormone 2. ACCEPT genes switched on / off 3. ACCEPT mRNA synthesised	(4)

Question Number	Answer	Additional guidance	Mark
4(d)(i)	chiasmata / pairing of homologous chromosomes / synapsis / formation of bivalents ;	IGNORE non-observable processes that are different ACCEPT crossing over ACCEPT spelling of chiasmata as chaismata or phonetically correct	(1)

Question Number	Answer	Additional guidance	Mark
4(d)(ii)	<ol style="list-style-type: none"> 1. crossing over and { independent/ random} assortment ; 2. description of crossing over as swapping over sections of { chromatid / DNA } ; 3. description of independent assortment of maternal and paternal chromosomes ; 4. consequence described e.g. produces recombinants or new combinations of alleles ; 	1. this mark can be awarded if there are no correct details provided for either process	(2)