Question Number	Answer	Mark
1(a)(i)	C ;	**(1)**

Question Number	Answer	Mark
1(a)(ii)	A ;	**(1)**

Question Number	Answer	Mark
1(a)(iii)	D ;	**(1)**

Question Number	Answer	Mark
1(b)(i)	1. reference to graph ; 2. line (graph) / eq ; 3. {Y / vertical} and {X / horizontal} axes correctly described. e.g. mass versus time / rate versus temperature ; 4. idea of using same scale for axes (for both plants) ; 5. idea of plotting each {temperature / species (plant)} separately ;	**(3)**

Question Number	Answer	Mark
1(b)(ii)	1. idea of controlling a variable ; 2. reference to {optimum / suitable / eq} temperature (for germination) ; 3. idea of using {viable / live / eq} seedlings OR making sure that seeds {germinate / eq} ; 4. reference to validity of the investigation ;	**(2)**

Question Number	Answer	Mark
1(b)(iii)	1. sea plantain / *Plantago maritima* / *Plantago* ; Any **three** from: 2. idea of different latitudes have different (mean) temperatures ; 3. {sea plantain / *Plantago maritima* / *Plantago*} grows {better / eq} at all (three) temperatures / eq ; 4. {bog sedge / *Kobresia simpliciuscula*/ *Kobresia*} does not grow very well at {lower temperatures / $10^{o}C$ and $14^{o}C$} / eq ; 5. credit appropriate comparative manipulated figures ;	**(4)**

Question Number	Answer	Mark
2(a)	1. growth / eq ; 2. asexual reproduction / eq ;	**(2)**

Question Number	Answer	Mark
2(b)(i)	B ;	**(1)**

Question Number	Answer	Mark
2(b)(ii)	D ;	**(1)**

Question Number	Answer			Mark
2(c)	Metaphase		Anaphase	**max (3)**
	1. idea of {chromatids/ chromosomes) at {equator / eq} of cell		Not at equator / separated / pulled apart / eq ;	
	2. idea of chromatids attached (to each other / at equator)		romatids separated / pulled apart	
	3. idea of centromere complete	**OR**	centromere {splits / eq} ;	
	4. idea of spindle complete	**OR**	fibres {shorter / shortening / contracting} ;	

Question Number	Answer	Mark
3(a)(i)	C ;	**(1)**

Question Number	Answer	Mark
3(a)(ii)	C ;	**(1)**

Question Number	Answer	Mark
3(b)(i)	temperature ;	**(1)**

Question Number	Answer	Mark
3(b)(ii)	1. rate of growth increases as temperature increases {between 13°C and 22°C / up to 22°C} ; 2. rate of growth decreases {between 22°C and 25°C / above 22°C} ; 3. use of manipulated data to support above e.g. increases by {0.7 (a.u.) / 4.5 times}, decreases by 0.1 (a.u.) ; 4. reference to enzymes involved (in growth) ; 5. molecules {move about more / have more kinetic energy}, as temperature increases ; 6. (therefore) {enzyme and substrate (molecules) collide more / rate of enzyme-substrate complexes formation increases} as temperature increases ; 7. correct reference to denaturation of some {enzyme / protein / eq} (molecules) ; 8. (therefore) rate of {growth / reactions} decreases as fewer enzyme molecules available ;	**max (4)**

Question Number	Answer	Mark
3(b)(iii)	1. idea that (each temperature) has same light intensity ; 2. correct reference to must be above {threshold / compensation point} ; 3. (below which) no net photosynthesis takes place / eq ; 4. reference to {so light is not limiting factor / so temperature is the limiting factor}; 5. photosynthesis produces {material / eq} needed for growth / eq ;	**max (3)**

Question Number	Answer	Mark
3(b)(iv)	1. {wavelength / colour / frequency} of light ; 2. CO_2 concentration / eq ; 3. pH / eq (of solution) ; 4. reference to {mineral / eq} ;	**max (2)**

Question Number	Answer	Mark
4 (a)	1. organ ; 2. (organ) system ;	**(2)**

Question Number	Answer	Mark
4 (b)(i)	1. ref to DNA replication ; 2. so that it can halve / eq ; 3. idea that {new cells will have same amount as original /original (DNA) content restored} ; 4. during cytokinesis / eq ;	**maximum (2)**

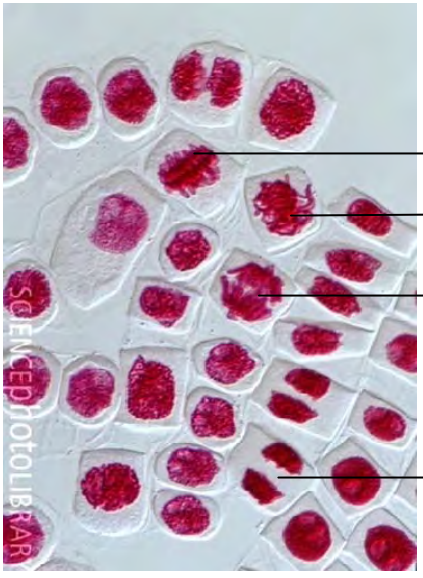
Question Number	Answer	Mark
4 (b)(ii)	3.5 to 3.75 (hours) ;	**(1)**

Question Number	Answer	Mark
4 (b)(iii)	1. (75 ÷ 270) X 18 ; 2. answer correct 5 (hours) ;	**(2)**

Question Number	Answer	Mark
4 *(c) QWC	(QWC – Spelling of technical terms *(shown in italics)* must be correct and the answer must be organised in a logical sequence) 1. *chromosomes /chromatids* {condense / become visible / eq} ; 2. {*nuclear* envelope / eq } {breaks down / eq} ; 3. {*nucleolus* / eq } {breaks down / eq} ; 4. *spindle* (fibre) begins to form / eq ; 5. *centrioles* migrate to opposite poles / eq ;	**maximum (3)**

Question Number	Answer	Mark
5(a)		**(2)**

Statements about cell division	**Meiosis is involved**
Required for both sexual and asexual reproduction	
Produces gametes	✓ ;
Crossing over can occur	✓;
Occurs in mammals but not flowering plants	

Question Number	Answer	Mark
5(b)	 A – metaphase ; B – prophase ; C – anaphase ; D – telophase ;	**(4)**

Question Number	Answer	Mark
5(c)(i)	site of {cell division / mitosis / actively dividing cells / meristem / eq);	**(1)**

Question Number	Answer	Mark
5(c)(ii)	to {soften the material / macerate / break middle lamella / eq};	**(1)**

Question Number	Answer	Mark
5(c)(iii)	{(acetic) orcein / lacto-propionic orcein / toluidine (blue) / Schiffs / eq} ;	**(1)**

Question Number	Answer	Mark
5(c)(iv)	each mark is for the risk + appropriate precaution 1. cut and appropriate precaution ; 2. acid and appropriate precaution ; 3. heat and appropriate precaution ; 4. stain and appropriate precaution ; 5. coverslip and appropriate precaution ;	**max (2)**