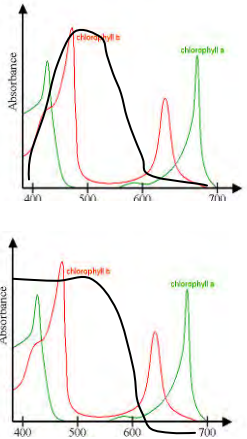


Question		Answer	Marks	Guidance
1	(a)	(cells) have partially permeable membrane (1) potato / cells are more concentrated than the distilled water (1)	2	allow semi-permeable membrane answer must be comparative allow cells have lower water concentration (than distilled water) allow correct ref. to concentration gradient allow higher level answers relating to water potential assume unqualified references to concentration refer to solute e.g. water moves from high to low concentration = 0 but water moves from high water concentration to low water concentration = 1
	(b) (i)	any two from: cells are full of water / cells are rigid / cells swollen / AW (1) cells are turgid / turgor pressure (1) clear description of turgor: e.g. contents of cells pushing against cell wall (1)	2	ignore cells take in water (in question) ignore chip is rigid ignore cells are stronger / hard allow chip is turgid ignore not flaccid
	(ii)	A (1)	1	
Total			5	

Question	Answer	Marks	Guidance
2 a	undifferentiated cells / unspecialised cells (1) idea that can develop/change into different types of cells (1)	2	ignore can change into anything
b	made from skin cells (1) normal stem cells come from embryos (1)	2	allow made from differentiated cells allow stem cells come from bone marrow / umbilical cord
c	any two from: (no –do not credit) produced by meiosis (1) genetically / DNA different / contain different combinations of chromosomes (1) only contain one of each pair of chromosomes (1)	2	Yes = 0 allow phonetic spelling e.g. miosis
d	idea that just because it was successful in mice this does not mean it will be successful in humans/human cells might react differently (1) idea that this is germline treatment / that if anything goes wrong it can affect all descendants (1)	2	ignore it's unethical / immoral / against God etc. ignore any social/cultural aspects come under the umbrella of unethical ignore simply 'cost' but allow expanded economic argument e.g. money spent on this will be money taken away from other treatments/preventions (1)
e	energy (source) (1)	1	allow for swimming / movement ignore respiration reject producing energy allow release energy allow higher level, specific answers, e.g. active transport
f i	protein synthesis / make proteins / join amino acids together (1)	1	allow higher level answer: translation
ii	mRNA / messenger RNA (1)	1	ignore just RNA
iii	A, T, C, G (1)	1	must have all four ignore order ignore U / uracil allow names: adenine, thymine, cytosine, guanine
	Total	12	

Question			Answer	Marks	Guidance
3	(a)	(i)	answer in range 9-10 (years) (1)	1	
		(ii)	answer in range 0-1 (years) (1)	1	
		(iii)	13.5 (years) (1) greatest (vertical) distance/height between lines / AW (1)	2	allow answer in range 13-14 (years) mark the two points independently
	(b)	(i)	mitosis (1)	1	allow phonetically correct spelling
		(ii)	DNA unzips (1) add bases (1) but add complementary bases (2)	3	marks may be awarded to a diagram ignore DNA unwinds / splits allow double helix unzips ignore chromosome unzips ignore descriptions of cell division allow add nucleotides (1) allow A pairs with T / C pairs with G (2)
			Total	8	

Question	Answer	Marks	Guidance
4 a	outside cells (1)	1	allow on the surface / on the leaf / on the outside allow secrete enzymes
b	low rate of (aerobic) respiration / need oxygen for (aerobic) respiration / ORA (1) low rate of growth/reproduction OR need oxygen for growth/reproduction (1)	2	allow no respiration allow need oxygen for metabolism/energy allow no growth / no reproduction
c	water moves into cells on outside / water moves out of cells on inside (1) (because) solute moves into cells on outside / solute moves out of cells on inside (1) solute moved by active transport (1)	3	allow valid example of solute e.g. sugar / ions
d	a line that falls to (or almost to) zero in the red part of the spectrum (1) 	1	
Total		7	