

Question number	Answer	Notes	Marks
1 (a)	removal of nucleus / without a nucleus / no nucleus / eq;	ignore without DNA	1
(b)	retina / fovea / yellow spot / macula / macula lutea;	reject if in list eg. retina and iris	1
(c)	1. ss (aerobic) respiration; 2. ss energy / ATP; 3. <u>erobic</u> respiration; 4. ctic acid; 5. low pH / acidic; 6. enature <u>enzymes</u> ;	5. ignore if linked to carbon dioxide	4
(d)	1. thin / one cell thick; 2. pores / gaps / permeable / eq; 3. short <u>diffusion</u> distance / faster <u>diffusion</u> / better <u>diffusion</u> / eq;	reject cell wall	2

(e)	<ol style="list-style-type: none"> 1. not rejected / no need to match / for specific person; 2. no shortage of organs / less waiting time / better supply / no need of donors / organs always available; 3. free from infection / free from disease / ref. to age; 		2
(f)	<ol style="list-style-type: none"> 1. nucleus (from body cell) put into empty egg / enucleated egg; 2. electricity; 3. mitosis / cell division; 4. embryo; 5. uterus / womb; 6. <u>surrogate</u> mother; 	ignore DNA removed	5

Total 15 marks

Question number	Answer	Notes	Marks
2 (a)	DNA / part of a chromosome / eq; codes for protein / makes protein / determines characteristic / determines named characteristic / eq;		2
(b)	(release/ produce) lots of eggs / more eggs / ovulate more / eq;	need idea of larger quantity	1
(c)	uterus / womb;		1
(d)	smoking / (having) cigarette / (having) tobacco;		1
(e)	<u>50</u> (%);		1
(f) (i)	protein/blood clotting factor digested/destroyed (by acid) / eq;	allow broken down ignore need to separate from milk ignore sugar	1
(f) (ii)	glucose; (more) respiration / energy / ATP; milk / meat production / growth / eq;		2
(g)	<u>transplant</u> / <u>transplantation</u> ; (more) hearts available / less shortage / less waiting time / no need for donors / few donors / lowers demand / eq; less immune response / less rejection / human proteins / human DNA / human genes / tissue type / better match / compatible / eq; less deaths / live longer / eq;	ignore work for longer / reduce heart attacks	3
		Total	12

Question number	Answer	Notes	Marks
3	cell; egg / ovum / sex; mitosis; embryo; uterus / womb; surrogate;	allow (udder) cell look carefully at spelling and reject meiosis	6

TOTAL 6 MARKS

Question number	Answer	Notes	Marks
4(a)	1. <u>bacteria / fungi / saprotrophs / saprophytes</u> ; 2. use enzymes; 3. break down / digest;	Mp 1 ignore microorganisms / microbes / decomposers / animals / woodlice / detritivores / maggots / slugs / nitrifying bacteria / denitrifying bacteria / nitrogen fixing bacteria / Mp 3 ignore eat / feed	2 max
(b)(i)	1. explants; 2. agar; 3. sterile / aseptic / method of sterilisation; 4. nutrients / ions / minerals / named mineral / glucose / carbohydrate / amino acids; 5. hormones / named hormone / rooting powder; 6. callus; 7. provide light / water / humidity / fogging;	Mp 2 ignore jelly / in vitro / Petri dish / culture medium Mp 3 allow if for apparatus Mp 4 ignore fertiliser Mp 7 ignore temperature / sun	5 max 2

(ii)	1. less minerals / leaching / less humus / less dead organic matter from leaf fall / fewer dead trees / less decomposition of trees; 2. less soil / soil erosion / unstable soil / flooded soil / waterlogged soil / soil washed away / eq;	Mp 1 ignore nutrients / nitrogen	
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Total 9 marks

Question number	Answer	Notes	Marks
5(a)	1. contains gene / allele / DNA; 2. from different <u>species</u> ;	Mp 2 ignore organism Mp 2 allow if both organisms are named and are clearly different species	2
(b)	insulin production / gene therapy / herbicide resistance / golden rice / organ transplants / human organs / named drug production / anti-freeze gene into strawberries / bioluminescence / goats and spider silk / eq;	Allow any transgenic example Allow hormone production	1

Total 3 marks