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. ___erobic respiration; 4. ctic acid; 5. low pH / acidic; 6. enature enzymes;	5. ignore if linked to carbon dioxide	4
(d)	1. thin / one cell thick; 2. pores / gaps / permeable / eq; 3. short diffusion distance / faster diffusion / better diffusion / eq;	reject cell wall	2

(e)	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)	1. nucleus (from body cell) put into empty egg / enucleated egg; 2. electricity; 3. mitosis / cell division; 4. embryo; 5. uterus / womb; 6. surrogate 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)	50 (%);		1
(f) (i)	protein/blood clotting factor digested/destroyed (by acid) / eq;	allow broken down ignore need to separate from milk	1
(ii)	glucose;	ignore sugar	
	(more) respiration / energy / ATP;		2
	milk / meat production / growth / eq;		
(g)	transplant / transplantation;	ignore work for longer / reduce heart attacks	
	(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;		3
	less deaths / live longer / eq;		
		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. bacteria / fungi / saprotrophs / saprophytes; 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	

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