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. less (aerobic) respiration;		
	2. less energy / ATP;		
	3. <u>anaerob</u> ic respiration;		
	4. lactic acid;		
	5. low pH / acidic;	5. ignore if linked to carbon dioxide	
	6. denature <u>enzymes</u> ;		4
(d)	1. thin / one cell thick;	reject cell wall	
	2. pores / gaps / permeable / eq;		
	<ol> <li>short <u>diffusion</u> distance / faster <u>diffusion</u> / better <u>diffusion</u> / eq;</li> </ol>		
			2

(e)	<ol> <li>not rejected / no need to match / for specific person;</li> <li>no shortage of organs / less waiting time / better supply / no need of donors / organs always</li> </ol>		
	available; 3. free from infection / free from disease / ref. to age;		2
(f)	<ol> <li>nucleus (from body cell) put into empty egg / enucleated egg;</li> </ol>	ignore DNA removed	
	2. electricity;		
	3. mitosis / cell division;		
	4. embryo;		
	5. uterus / womb;		
	6. <u>surrogate</u> mother;		
			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) (d)	uterus / womb; smoking / (having) cigarette / (having)		1
(e)	tobacco; 50 (%);		1
(f) (i)	protein/blood clotting factor digested/destroyed (by acid) / eq;	allow broken down ignore need to separate from milk	1
(ii) (g)	glucose; (more) respiration / energy / ATP; milk / meat production / growth / eq; <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;	separate from milk ignore sugar ignore work for longer / reduce heart attacks	2 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)	<ol> <li><u>bacteria / fungi / saprotrophs / saprophytes;</u></li> <li>use enzymes;</li> <li>break down / digest;</li> </ol>	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)	<ol> <li>explants;</li> <li>agar;</li> <li>sterile / aseptic / method of sterilisation;</li> <li>nutrients / ions / minerals / named mineral / glucose / carbohydrate / amino acids;</li> <li>hormones / named hormone / rooting powder;</li> <li>callus;</li> <li>provide light / water / humidity / fogging;</li> </ol>	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)	<ol> <li>less minerals / leaching / less humus / less dead organic matter from leaf fall / fewer dead trees / less decomposition of trees;</li> <li>less soil / soil erosion / unstable soil / flooded soil / waterlogged soil / soil washed away / eq;</li> </ol>	Mp 1 ignore nutrients / nitrogen

Total 9 marks

Question number	Answer	Notes	Marks
5(a)	1. contains gene / allele / DNA;		2
	2. from different <u>species;</u>	Mp 2 ignore organism Mp 2 allow if both organisms are named and are clearly different species	
(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