Question number	Answer	Notes	Marks
1 (a) (i)	pancreas;	allow pancrease	1
(b)	1. lower / reduce / regulate / maintain / control / eq; 2. <u>blood</u> sugar / <u>blood</u> glucose; 3. lycogen;	blood glucose to glycogen = 2 excess glucose to glycogen =1 released when glucose levels are high = 1	2
(c) (i)	1. <u>human</u> gene / <u>human</u> DNA / <u>human</u> allele; 2. restriction / endonuclease; 3. <u>plasmid</u>; 4. <u>vector</u>; 5. <u>same</u> restriction enzyme; 6. recombinant; 7. ligase;	gene for insulin = 0 human gene for insulin = 1	5
(ii)	D - transgenic;		1
(d) (i)	1. oxygen / aerobic ; 2. respiration;		2
(ii)	1. less/no insulin / less production; 2. fewer bacteria / kill bacteria / eq; 3. enzymes; 4. (not) optimum pH; 5. denatured / changed active site / destroyed;		4

(Total for Question = 15 marks)

Question number	Answer	Notes	Marks
2 (a) (i)	restriction (enzyme) / endonuclease;	ignore other words such as DNA or enzyme	1
(ii)	ligase;		1
(iii)	plasmid / virus / gene gun / eq;		1
(b)	gene/DNA/allele from different species / human genes in sheep / eq;	ignore foreign ignore organism / animal allow named examples such as spider to goat	1
(c)	1. genetical identical / same genes / same DNA / same alleles / all sheep have the gene / eq; 2. pro ce the protein / clotting agent / factor IX; 3. re (human) protein/clotting agent / mass production / eq; 4. re sheep / many sheep / faster (re)production of sheep / faster production of offspring / eq; 5. only hav to do GM once / no need to repeat GM / eq;	ignore identical alone ignore non-clotting proteins such as antibodies ignore faster alone mark point is for sheep production	Max 3
(d) (i)	platelets;		1
(ii)	1. less ood loss / eq; 2. less entr of microbes / less entry of pathogens / less infection / less disease / eq;		2

Total 10 marks