Question number			Answer	Notes	Marks
1	(a)	(i)	pancreas;	allow pancrease	1
	(b)		 lower / reduce / regulate / maintain / control / eq; blood sugar / blood glucose; lycogen; 	blood glucose to glycogen = 2 excess glucose to glycogen =1 released when glucose levels are high = 1	2
	(c)	(i)	 human gene / human DNA / human allele; restriction / endonuclease; plasmid; vector; same restriction enzyme; recombinant; ligase; 	gene for insulin = 0 human gene for insulin = 1	
		(ii)	D - transgenic;		5
		(11)	D transgeme,		1
	(d)	(i)	 oxygen / aerobic ; respiration; 		2
		(ii)	 less/no insulin / less production; fewer bacteria / kill bacteria / eq; enzymes; (not) optimum pH; 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 /	1
				animal	
				allow named examples such as spider to goat	
	(c)		genetically identical / same genes / same DNA / same alleles / all sheep have the gene / eq;	ignore identical alone	Max 3
			2. produce the protein / clotting agent / factor IX;		
			more (human) protein/clotting agent /mass production / eq;	ignore non-clotting proteins such as antibodies	
			4. more sheep / many sheep / faster (re)production of sheep /faster production of offspring / eq;	ignore faster alone mark point is for sheep production	
			5. only have to do GM once / no need to repeat GM / eq;		
	(d)	(i)	platelets;		1
		(ii)	1. less blood loss / eq;		2
			2. less entry of microbes / less entry of pathogens / less infection /less disease / eq;		