

- 1.a) D (1)
- 1.b) A (1)
- 1.c) B (1)
- 1.d) B (1)
- 1.e) C (1)
- 1.f) C (1)

2)

- 1. transcription ;
- 2. mRNA / eq ;
- 3. translation ;
- 4. ribosomes / rough endoplasmic reticulum / RER ;
- 5. tRNA / eq ;
- 6. peptide / covalent ;

(6)

- 3.a) A (1)
- 3.b) C (1)
- 3.c) D (1)
- 3.d) D (1)
- 3.e) C (1)
- 3.f) A (1)

4)

(a)(i)	<ul style="list-style-type: none"> 1. phospholipids ; 2. phosphate (head) ; 3. (two) fatty acid (tails) ; 4. reference to location of glycerol ; 5. correct reference to ester bonds ; 	max (3)
(a)(ii)	<ul style="list-style-type: none"> 1. reference to {hydrophilic / polar / charged} part ; 2. reference to {hydrophobic / non polar / uncharged} part ; 3. reference to orientation of molecule in relation to water; 4. idea that aqueous environment is {on two sides / cytoplasm and {environment / tissue fluid / eq}} ; 	max (3)

<p>number (b)</p>	<p>Active transport:</p> <ol style="list-style-type: none"> 1. idea that molecule {binds / fits into} {protein / carriers} ; 2. idea that {protein / carrier} changes shape ; 3. (molecules move) against a concentration gradient / eq ; 4. reference to use of {ATP / energy} ; <p style="text-align: right;">[Submax 2 marks]</p> <p>Facilitated diffusion:</p> <ol style="list-style-type: none"> 5. reference to proteins as {channels / gates / pores / carriers} ; 6. idea that {channels can open or close / carriers change shape} ; 7. for {large / polar / charged} molecules (to pass through membrane) ; 8. (molecules move) down a concentration gradient / eq ; <p style="text-align: right;">[Submax 2 marks]</p>	<p style="text-align: right;">max (3)</p>
<p>number (c)(i)</p>	<ol style="list-style-type: none"> 1. idea that both types of protein in fused cell in correct context ; 2. idea that the proteins are {intermingled / mixed / eq} ; 3. same original number of protein / eq ; 	<p style="text-align: right;">max (2)</p>
<p>(c)(ii)</p>	<ol style="list-style-type: none"> 1. idea that {phospholipids / molecule A} allow {fluidity / movement/ eq} ; 2. idea that {fluidity / movement / eq} allow membranes to fuse; 3. idea that {fluidity / movement / eq} allows protein to {move / intermingle / eq} ; 	<p style="text-align: right;">max (2)</p>

5)		
(a)	<p>1. reference to {enzymes / biological catalysts} reducing activation energy / eq ;</p> <p>Biological catalyst</p> <p>2. produced by {organisms / cells};</p> <p>3. speeds up (rate of) {reactions / processes} / eq ;</p> <p>Activation energy</p> <p>4. energy needed for a reaction to occur / eq ;</p> <p>5. By causing bonds to {break / weaken / form} / by increasing the number of collisions / eq ;</p>	<p>max (4)</p>
(b)	<p>1. idea that there should be enough substrate molecules to saturate the enzyme ;</p> <p>2. (to ensure that) substrate is not a limiting factor/ eq ;</p> <p>3. {fastest / highest} rate / decreases after initial rate / eq ;</p> <p>4. as reaction proceeds substrate concentration decreases / eq ;</p> <p>5. as substrate gets used up {by enzyme / in reaction / eq } ;</p> <p>6. substrate concentration should be constant (in each test) / eq ;</p>	<p>max (2)</p>
(c)	<p>Any two pairs</p> <p>pH ; buffer ;</p> <p>temperature ; water bath ; not room temperature</p> <p>time of reaction ; stopwatch ;</p> <p>volume of {enzyme / substrate} ; not amount measuring cylinder / pipette ;</p> <p>type of enzyme ; same batch of enzyme ;</p>	<p>(4)</p>

6)		
a)	<ol style="list-style-type: none"> 1. tumour has {decreased in size / grown less / eq} ; 2. decrease in size quantified ; 3. rats survive longer / eq ; 4. idea that {more rats survive / higher survival rate / lower death rate} ; 5. 80% ; 	max (3)
b)(i)	<ol style="list-style-type: none"> 1. reference to (virus acting as a) vector ; 2. idea that virus is used to get the {gene / DNA} into the cells ; 	(2)
b)(ii)	reference to {neurones in spinal cord / endorphins being made in spinal cord / spinal cord connects to brain / eq} ;	(1)
b)(iii)	idea that endorphins have pain-reducing properties / more {endorphins / endorphins secreting cells} produced ;	(1)
number		
b)(iv)	<ol style="list-style-type: none"> 1. {little change / eq} in control but treated rats {rise and fall / eq} ; 2. in first {2 weeks / ½ month} level of tolerance is {(almost) the same in both groups slightly higher in control group} / eq ; 3. after the first 2 weeks the level of tolerance is higher in the rats given gene therapy / eq ; 4. between 2 weeks and 2 months there is an increase in tolerance in rats given gene therapy but control group {remains the same / drops (slightly)} / eq ; 5. ref to decrease in tolerance in group given gene therapy {in last month / after two months} and (slight) increase in control group ; 6. credit correct comparative manipulation of figures ; 	max (3)

7) number		
(a)(i)	<ol style="list-style-type: none"> 1. reference to {COOH/ carboxylic/ acid} grouping (at one end) ; 2. (long hydro)carbon chain / eq ; 3. 18 carbons / 17 carbons in hydrocarbon chain / eq ; 4. Correct reference to (poly) unsaturated ; 5. 3 carbon-carbon double bonds / 4 double bonds ; 6. kinked structure / eq ; 	max (2)
(a)(ii)	<p>Any one from</p> <ol style="list-style-type: none"> 1. omega 3 has {3 carbon-carbon double bonds / 4 double bonds} , omega 6 has {2 / 3 } / eq ; 2. omega 3 has less hydrogens / eq ; 3. omega 3 is {kinkier / shorter} / eq ; 4. omega 3 less saturated / eq ; 	max (1)
(a)(iii)	<ol style="list-style-type: none"> 1. indication that fatty acid forms a bond with the OH group of the glycerol molecule ; 2. indication that water is formed ; 3. ester bond correctly drawn ; 	(3)
number		
(b)	<ol style="list-style-type: none"> 1. less grass less omega 3 / eq ; 2. less grass more omega 6 / eq ; 3. more grass reduces the omega 6 to omega 3 ratio / eq ; 4. credit correct manipulation of figures ; 	max (3)