

Question Number	Answer	Additional Guidance	Mark
1(a)	<ol style="list-style-type: none"> 1. (structure G is {glycoprotein / gp120} ; 2. used for {attachment / eq} to CD4 (molecules / receptors / antigens) ; 3. on T helper {cells / lymphocytes} ; 	<ol style="list-style-type: none"> 1. IGNORE gp 41 and gp 160 and other wrong numbers 3. ACCEPT macrophages / dendritic cells / CD4 cells 	(3)

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	<ol style="list-style-type: none"> 1. they are globular proteins ; 2. it has an active site ; 3. idea of {charged R groups on outside of molecules / composed of many small R groups} ; 	<ol style="list-style-type: none"> 2. idea of active site R groups enable binding of substrate 3. idea of hydrophilic on the outside 	(3)

Question Number	Answer	Additional Guidance	Mark
*1(b)(ii)	<p>(QWC – spelling of technical terms must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none"> 1. idea that drugs would prevent viral replication ; 2. idea that T (helper) {cells / lymphocytes} will not be { killed / burst / destroyed} (by virus particles leaving cell) ; 3. idea of {inhibition / eq} of reverse transcriptase ; 4. idea that (viral) DNA could not be made; 5. from the (viral) RNA ; 6. idea of {inhibition / eq} of integrase ; 7. idea that (viral) DNA cannot integrate into (host) {DNA / genome} / eq ; 	<p>QWC emphasis on clarity of expression</p> <ol style="list-style-type: none"> 1. ACCEPT description of virus formation 3. ACCEPT drugs prevent action of reverse transcriptase 4. reject idea that RNA is {turned into / converted into} DNA 6. ACCEPT drugs prevent action of integrase 7. ACCEPT idea that drugs would prevent {latency / formation of provirus / eq} ; 	(5)

Question Number	Answer	Additional Guidance	Mark
2(a)(i)	<ol style="list-style-type: none"> {skin / epidermis} is a barrier / eq ; reference to keratin ; reference to lack of receptors (for the virus) ; 	Accept prevents entry but not prevents infection NB keratin in skin forms a barrier = 2 marks Accept skin has different receptors	(2)

Question Number	Answer	Additional Guidance	Mark
2(a)(ii)	<ol style="list-style-type: none"> idea that viruses only {infect / attach to / eq} {specific receptors / specific cells / host cells} ; idea that receptors not present on {blood cells / endothelial cells / eq} ; reference to {destruction / eq} of viruses by phagocytes ; 	Accept white blood cells. neutrophils; PMN Ignore macrophages Not lymphocytes, T cells, plasma cells	(2)

Question Number	Answer	Additional Guidance	Mark
2(b)	<ol style="list-style-type: none"> reverse transcriptase (required) in HIV, no reverse transcriptase in cold virus ; DNA formed (using RNA) in HIV, {no DNA formed / RNA used to make protein / translation} in cold virus ; reference to {provirus / latency / delay in virus formation / eq} in HIV infection, {no provirus / lytic cycle / (immediate) formation of virus particles / eq} in cold virus ; 	NB answers can be pieced together but candidates still have to state both parts of mark point	(2)

Question Number	Answer	Additional Guidance	Mark
2(c)(i)	<ol style="list-style-type: none"> 1. to synthesise (common cold) RNA / eq ; 2. for amino acids to bind to tRNA / eq ; 3. to synthesise (common cold) protein (capsid) / eq ; 	Accept translation	(2)

Question Number	Answer	Additional Guidance	Mark
2(c)(ii)	<ol style="list-style-type: none"> 1. idea of enzyme affecting { molecules in membrane / proteins / (phospho)lipids / cholesterol} ; 2. enzyme breaks { bonds / named bonds / eq} ; 3. reference to {(by) hydrolysis / hydrolytic enzymes} ; 4. credit detail of enzyme action ; 5. reference to enzyme U as {protease / lipase / cholesterase} ; 	eg lowers activation energy, binding of active site to substrate (cannot credit reference to catalyst, as in stem of question) Ignore lysosyme	(3)

Question Number	Answer	Additional Guidance	Mark
3(a)	<ol style="list-style-type: none"> 1. reference to enzymes {killing / destroying / eq} (microorganisms) ; 2. reference to {stomach acid / hydrochloric acid / HCl} {killing / destroying / eq} (microorganisms) ; 3. reference to lack of oxygen affecting (microorganisms) ; 4. idea of competition by gut flora with (microorganisms) ; 5. idea that insufficient numbers of (microorganisms) (to cause food poisoning) ; 6. idea that the (microorganisms) may not be {pathogenic/ harmful / cause food poisoning} ; 7. reference to (immediate) vomiting to remove (microorganisms) ; 	<p>1. Accept lysozymes / enzymes in saliva Accept enzymes destroying viruses</p> <p>2. Accept acid destroying viruses</p> <p>3. No viruses</p> <p>4. No viruses</p> <p>6. No pathogens</p>	(3)

Question Number	Answer	Additional Guidance	Mark
3(b)(i)	1. reference to synthesis of RNA ; 2. using host cell {enzymes / named enzyme / (RNA) nucleotides} ; 3. reference to synthesis of (viral) proteins ; 4. using host cell {enzymes / named enzyme / amino acids / ribosomes / tRNA / ATP} ; 5. reference to assembly of {viruses / particles} (inside cells) ;	1. Accep mRNA 2. No reverse transcriptase 5. Acce protein and RNA {form / make / eq} {viruses / particles}	(4)

Question Number	Answer	Additional Guidance	Mark
3(b)(ii)	1. idea of a delay (up to 24 hours) whilst viral particles are replicating / eq ; 2. idea that a virus can {result in many particles being formed / replicate very fast} ; 3. idea that more host cells infected ;	2. Acce reference to lytic cycle	(2)

Question Number	Answer	Additional Guidance	Mark
3(b)(iii)	1. reference to the {hand wash / alcohol} not affecting the virus ; 2. reference to (noro) virus {not having an envelope / surrounded by protein / eq} ; 3. alcohol does not {damage protein coat / penetrate} virus / eq ; 4. protein is hydrophilic / alcohol is an organic solvent / eq ;	1. No does not kill virus 2. Accep surrounded by a capsid	(2)

Question Number	Answer	Mark
4(a)	C ;	(1)

Question Number	Answer	Mark
4(b)(i)	<ol style="list-style-type: none"> 1. {T helper / CD4 (positive)} (cell / lymphocytes) ; 2. phagocytic cells e.g. macrophages, dendritic cell ; 	(2)

Question Number	Answer	Mark
4(b)(ii)	<ol style="list-style-type: none"> 1. reference to (HIV) binds to (CD4) receptors on cell (surface) ; 2. ref to CD4 (receptors on cells) ; 3. reference to {glycoprotein / gp120} on virus (surface) ; 4. reference to fusion of virus (envelope) with (cell surface) membrane ; 5. idea of phagocytosis (in macrophage / eq) ; 	(3)

Question Number	Answer	Mark
4(b)(iii)	<ol style="list-style-type: none"> 1. reference to viral RNA ; 2. reference to production of (viral) DNA (using viral RNA as a copy) ; 3. correct ref to reverse transcriptase ; 4. reference to incorporation of viral DNA into host cell's {DNA /genome } / reference to provirus / eq ; 5. correct ref to integrase ; 6. reference to production of {viruses / viral RNA and proteins} / eq ; 7. idea of infection of further (T helper) cells ; 8. reference to destruction of (T helper) cells by T killer cells OR reference to cell lysis / eq ; 9. reference to lowering of immunity ;(to other diseases ; 10. credit reference to role of T helper cells in immune response e.g. produce cytokines, activate B cells / killer cells ; 11. death is caused by e.g. opportunistic disease, pneumonia , TB, Kaposi's sarcoma, cancer, dementia, extreme weight loss, meningitis, toxoplasmosis ; 	(6)