

Multiple Choice Answers

Q30: A

Q31: B

Q32: D

Q33: B

Multiple Choice Answers

Q32: D

2(a)	<i>any two from:</i> (each haem contains) an, iron ion / ferrous ion / Fe^{2+} ; A iron / iron atom (each haem) binds to / AW, an oxygen molecule / two oxygen atoms ; A forms a bond <i>only if</i>, iron ion / ferrous ion / Fe^{2+}, stated
2(b)	<i>any three from:</i> less carbon dioxide diffuses into red blood cells ; less carbon dioxide reacts with water ; less carbonic acid is formed ; less, dissociation of carbonic acid / formation of hydrogen ions and hydrogen carbonate ions ; less haemoglobin acid is formed ; A description e.g. H^+ binds to haemoglobin less oxygen (released from haem) diffuses out of red blood cells (to respiring tissues) ; <i>ref. to carbamino haemoglobin ;</i> <i>AVP ; e.g. ref. to change in shape of haemoglobin when H^+ binds</i>
2(c)(i)	<i>idea that blood vessel X carries (oxygenated blood) at high pressure (to body tissues) ;</i> A <i>ref. to systemic circulation</i> <i>any two from:</i> <i>difference</i> high proportion of elastic fibres (and low proportion of smooth muscle) ; <i>explanation</i> (elastic fibres allow X to) expand / stretch, qualified ; e.g. to accommodate / AW, blood from ventricular, systole / contraction with, surges / pulses, of blood leaving heart to prevent, bursting / rupture recoil of elastic fibres, detail ; e.g. to allow surges / pulses, to continue <i>idea of allowing continued flow of blood to tissues</i> maintains, onward pressure / high pressure of blood <i>if no marks gained in this section allow one mark for:</i> <i>stretch and recoil with one detail</i> or <i>ref. to two correct details but stretch and recoil not stated</i>

2(c)(ii)	<i>allow, impulses / wave of excitation, for electrical impulses</i> R nerve impulses <i>once and allow ecf must attempt AVN <u>and</u> Purkyne tissue to gain max</i> <i>any four from:</i> both involved in, co-ordination / control, of, systole / contraction, of, heart / heart muscle / cardiac muscle / ventricles ; AVN only pathway for impulses to travel from atria to ventricles ; AW A impulses must pass through AVN for ventricular, contraction / systole allow, a delay / 0.1 s, for impulse to pass from atria to ventricles ; so, ventricles contract after atria contract / ventricular systole occurs after atrial systole ; allows atria to (fully) empty before, ventricles (begin to) contract / ventricular systole or allows blood to fill ventricles before ventricular, contraction / systole ; Purkyne tissue carries / transmits / AW, impulse(s), (down septum), to base of ventricles / through walls of the ventricles ; for ventricular systole / AW ; ventricular muscles contract / AW, together / at same time / simultaneously / from the base upwards / from apex of heart ;
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1(a)	<i>any two from:</i> <i>allow oras</i> 1 cilium composed of microtubules or microvillus, composed of microfilaments / contains actin (filaments) ; 2 cilium 9+2 (microtubule) arrangement ; 3 cilium has basal body ; A has centrioles at the base 4 cilium shows synchronous, rhythm / movement ; A whip-like / rhythmic, movement 5 cilium, moves / wafts, mucus or microvillus increases, surface area / SA, for, absorption / uptake / secretion ; A increases SA to locate transport proteins AW 6 AVP ; e.g. cilium has dynein (arms) cilium is, longer (10 μm) / wider (0.2 μm) or microvillus is, shorter (1 μm) / narrower (90 nm)
1(b)	<i>any one from:</i> protects (intestinal), epithelium / cells / lining ; A examples of protection e.g. damage from stomach acid / digestion by enzymes A less likely for epithelial cells to be damaged / AW A traps, pathogens or (harmful), bacteria / microbes / microorganisms I dust A prevents, pathogens / AW, from reaching cells eases / reduces friction for, movement of, gut contents / substances (through digestive system) ; habitat / nutrient source, for gut, microorganisms / flora ; AW AVP ; e.g. location for immune system cells R if stated as being in the gas exchange system
1(c)(i)	arteriole ; A (small) artery

1(c)(ii)	any two from: (at arteriole end of capillary) high, <u>hydrostatic</u> / <u>blood</u>, pressure ; A ref. to hydrostatic pressure gradient (ultra)filtration / described ; e.g. fluid / plasma / water <u>and</u> solutes, forced / comes out of, capillaries / blood glucose / amino acids / ions, leave (blood) or (large / plasma) proteins remain (in blood) ; R if stated, red blood cells / platelets, leave through, fenestrations / fenestrae / endothelial pores or pores / gaps / spaces, in, capillary wall / endothelium / between cells ;
1(d)	any three from: <i>after, secreted / released, by enteroendocrine cells</i> transport of, peptide / GLP-1 / ligand, in, blood / circulation ; to, <u>target cells</u> (which are cells of the, stomach / pancreas) ; binding of, peptide / GLP-1 / ligand, to receptor ; <i>context can be cell surface membrane or intracellular</i> <i>ref. to, specificity / complementary ; must be in correct context of GLP-1 binding to receptor</i> (binding) triggers / sets off / AW, events within (target) cell (leading to the response) ; A examples e.g. signal transduction / triggers enzyme cascade
1(e)(i)	prophase metaphase anaphase telophase } ; R if interphase or cytokinesis stated

1(e)(ii)	any three from: <i>ref. to nucleus / nucleolus, is neutral</i> presence of, vesicles / vacuoles, qualified ; e.g. many / secretory / Golgi A storage vesicles correct <i>ref. to</i> exocytosis ; A fusion of, vesicle / vacuole, with <u>cell surface membrane</u> much / high proportion of / a lot of / AW, <u>rough endoplasmic reticulum</u> ; I ER / RER / rough ER A many ribosomes rough endoplasmic reticulum / ribosomes, site of, peptide / polypeptide / protein / enzyme, synthesis ; ecf for abbreviating rough endoplasmic reticulum previously AVP ; e.g. presence of mitochondria to provide, ATP / energy, for, protein synthesis / movement of vesicle to cell surface membrane / exocytosis <i>mp2 can also be awarded here only if ref. has been made within response to vesicles / vacuoles</i>
1(e)(iii)	Paneth cell is, <u>differentiated</u> / <u>specialised</u> (for, secretion / its function) or stem cells are, <u>undifferentiated</u> / <u>not differentiated</u> / not specialised ;

6(a)	- consider <u>all</u> mps to award if response clearly addresses events in the left side - mps 1,2,6,7,8 must be in the context of the left side of the heart - otherwise allow mp 3, 4, and 5 to max 3 – these mark points are inset to the right any five from: 1 blood enters (heart) via / in, pulmonary vein(s) ; 2 blood exits heart to aorta ; R aorta 3 blood flows from atrium to ventricle ; 4 atrial, systole / contraction, then, ventricular, systole / contraction ; A atrium contracts then ventricle contracts 5 pressure in ventricle, increases / gets higher ; I high pressure 6 bicuspid / (left) atrioventricular valve closes ; A mitral valve R if in context of events in the atrium 7 semilunar / aortic, valve opens ; ecf from aorta in mp 2 R if in context of events in the atrium 8 bicuspid / (left) atrioventricular, valve closes when (blood) pressure in ventricle higher than atrium or semilunar / aortic, valve opens when (blood) pressure in ventricle higher than aorta ; A aortic valve unclear attempts / mixed right and left sides
6(b)(i)	if no marks gained allow one mark for four, polypeptides / polypeptide chains two, (identical) alpha / α, chains / globins, <u>and</u> two, (identical) beta / β, chains / globins ; A subunits / polypeptides, for chains R beta-pleated sheets / globulin plus one from; each, chain / globin / polypeptide, incorporates / contains / AW, a <u>haem</u> (group) ; A four haem groups A molecule for polypeptide if mp1 gained A ferrous ion / Fe^{2+} / iron (ion / atom), within porphyrin (ring) for haem group A prosthetic group with, ferrous ion / Fe^{2+} / iron (ion / atom) hydrogen bonds / hydrophobic interactions / ionic bonds, between, chains / polypeptides / globins ; context is <i>interactions between chains</i> R if disulfide bond also stated
6(b)(ii)	oxygen binds to, iron ion / ferrous ion / Fe^{2+} ; A oxygen bonds / oxygen forms a bond, <i>only if</i>, iron ion / ferrous ion / Fe^{2+} stated A oxygen binds to, iron / iron atom / haem (group) R if more than one oxygen molecule binds to one iron ion detail of saturated ; e.g. total of 4 oxygen molecules / 8 oxygen atoms (bind per haemoglobin molecule) each, chain / globin / polypeptide, binds one oxygen molecule R bonds <i>ref. to cooperative binding / allostery</i> A description <i>ref. to (fully saturated molecule is) in, high partial pressures of oxygen / high concentration of oxygen ;</i> <i>ref. to T / tense, state to, R / relaxed, state</i>