

Multiple Choice Answers

Q40: C

Multiple Choice Answers

Q24: D

1(a)	any two from: allow oras 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)	any one from: 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 ;

3(a)(i)	if DNA or thymine stated within response, allow <u>only</u> H-bond mark (ecf) any two from: (paired section) contains, complementary nucleotides / complementary bases / base pairs ; adenine-uracil <u>and</u> guanine/cytosine ; A A/U and G/C (paired by) hydrogen / H, bonds ; I strong (bonds) ecf from mp1 R if another bond also named I phosphodiester bonds between, adjacent / AW, nucleotides
3(a)(ii)	any two from: (enzyme / Drosha / Dicer) active site is specific (to site on dsRNA) ; <i>can apply in context of specific shaped active site or active site specific to a particular location</i> detail of different active sites of Drosha and Dicer ; site to be cleaved / AW, (only), fits into / can bind with / is complementary to (the specific) active site forms enzyme-substrate complex at a particular site Drosha and Dicer require different, conditions / cell locations, to function ; AVP ; e.g. <i>suggestion that</i> Dicer too large to enter nucleus Drosha exposed to degradation in cytoplasm
3(b)	any two from: mRNA is single-stranded <u>and</u> siRNA is double-stranded ; A polynucleotide / chain, for strand siRNA has paired and unpaired nucleotides or mRNA has, only unpaired nucleotides / no base pairing ; mRNA codes for a, sequence of amino acids / protein ; ora for siRNA mRNA has a longer sequence of nucleotides ; A mRNA, is longer / has more nucleotides AVP ; e.g. <i>ref. to</i> siRNA antiparallel / mRNA only 5' to 3' mRNA has no H bonds
3(c)(i)	any one from: RISC must, align with / attach to / form H bonds with, (target) mRNA ; (passenger strand needs to be, separated / released) to allow guide strand to, be exposed / bind to mRNA ; AW ora e.g. (otherwise) guide strand cannot bind to mRNA passenger strand prevents guide strand binding guide strand has complementary sequence to target sequence of mRNA ; ora passenger strand does not

3(c)(ii)	<i>allow protein for polypeptide</i> <i>points need the correct context of cleaved mRNA</i> <i>any three from:</i> <i>no protein formed</i> 1 <i>idea that mRNA may be degraded in cell before attaching to ribosome ;</i> 2 <i>mRNA may not (be able to) attach to ribosome so no, polypeptide formed / translation ;</i> 3 <i>cleaved mRNA results in loss of start, sequence / codon ;</i> <i>abnormal polypeptide formed</i> 4 <i>polypeptide chain is not released from ribosome ;</i> A <i>cleaved mRNA results in loss of stop codon</i> 5 <i>polypeptide chain degraded within cytoplasm / AW ;</i> 6 <i>cleaved mRNA results in short(er) (polypeptide) chain being produced ;</i> 7 <i>polypeptide does not, fold up / form correct tertiary structure / form correct 3D shape ; I tertiary structure changes</i> 8,9 <i>AVP ; e.g. (results in) different R-group interactions / change in number of bonds that can form active site / site of activity, changed / lost</i>
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2(a)(i)	<table><tr><td></td><td><i>E. turcicum</i></td><td><i>Z. mays</i></td></tr><tr><td>1 structural difference</td><td>chitin cell wall or no chloroplasts or hyphae / cells long and branching or syncytial / multinucleate / several nuclei per cell</td><td>cellulose cell wall or chloroplasts or no hyphae / cells not long and branching or one nucleus per cell ;</td></tr><tr><td>2 functional difference</td><td>heterotroph(ic) / parasitic / obtain food from host / do not photosynthesise</td><td>autotroph(ic) / phototrophic / photosynthesis(e) ;</td></tr></table>		<i>E. turcicum</i>	<i>Z. mays</i>	1 structural difference	chitin cell wall or no chloroplasts or hyphae / cells long and branching or syncytial / multinucleate / several nuclei per cell	cellulose cell wall or chloroplasts or no hyphae / cells not long and branching or one nucleus per cell ;	2 functional difference	heterotroph(ic) / parasitic / obtain food from host / do not photosynthesise	autotroph(ic) / phototrophic / photosynthesis(e) ;
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2(a)(ii)	<i>any four from:</i> 1 large groups divide into smaller groups ; 2 common / similar / shared, features within a group ; 3 <i>ref. three of:</i> kingdom – phylum – class – order – family ; 4 genus and species = binomial / Linnaean / Latin / scientific, name ; 5 (both in domain) Eukarya ; 6 different kingdoms / Fungi and Plantae ;									
2(b)(i)	<i>any two from:</i> 1 low percentage leaf damage means high resistance (to infection) ; 2 SKV50 = 22% <u>and</u> CML153 = 58% ; 3 SKV50 shows greater resistance (to infection) ;									
2(b)(ii)	continuous ;									
2(b)(iii)	<i>any four from:</i> 1 many / different / several / multiple, genes ; 2 affect, same trait / (percentage) area of leaf damage / resistance ; 3 <u>alleles</u> of, one / each, gene have a small effect ; 4 (different) <u>genes</u> have, additive / combined / interactive, effects ; 5 mathematical treatment to illustrate additive effect ;									

3(a)(i)	0.95 (no units) ; ;
3(a)(ii)	<i>any two from:</i> 1 B, run for less time / stopped early ; 2 chlorophyll, converted / changed, to phaeophytin ; 3 AVP ;
3(a)(iii)	<i>any one from:</i> 1 different solvents ; 2 different, TLC plate / chromatogram / stationary phase (material) ; 3 different temperatures ;
3(b)	<i>any four from:</i> <i>similarities</i> 1 both absorb, blue / between 400 and 475 nm ; 2 both absorb, little / no, light between 525 and, 600 / 630, nm or both absorb, little / no, green / yellow, light ; 3 AVP ; <i>max three differences</i> 4 chlorophyll a absorbs, at more / a larger range of, wavelengths ; 5 chlorophyll a absorbs, more / better, between 400 and 445 nm ; 6 carotenoids absorb, more / better, between 445 and 525 nm ; 7 chlorophyll a absorbs between, 600 / 640, and, 680 / 690 nm, <u>and</u> carotenoids do not ; 8 chlorophyll a (blue absorption) peak / highest, at 425 / 430 nm <u>and</u> carotenoids (blue absorption) peak / highest, at 460 / 465 nm ; 9 chlorophyll a has blue peak and red peak but carotenoids have two blue peaks and no red peak or chlorophyll a has two peaks but carotenoids have three peaks ;
3(c)	<i>any four from:</i> 1 gibberellin, moves to / acts on / stimulates, <u>aleurone</u> layer ; 2 binds to, (gibberellin) receptor / GID(1) ; 3 breaks down <u>DELLA</u> (protein) ; 4 releases, PIF / transcription factor ; 5 switches on <u>gene</u> for, amylase / maltase / protease ; 6 amylase, breaks down / hydrolyses, starch to maltose ; 7 sugars / glucose, for, respiration / growth, of embryo ;

5(a)	feature	ADH	glucagon	insulin	
	binds to receptors on cell surface membranes	✓	✓	✓	;
	results in molecules moving from cells into the blood	✓	✓	x	;
	is secreted as a result of detection by osmoreceptors	✓	x	x	;
5(b)	any four from: 1 impulses / action potentials / neurotransmitters, in nervous system <u>and</u> hormones in endocrine system ; 2 electrical in nervous system <u>and</u> chemical in endocrine system ; 3 neurones / nerve cells, in nervous system <u>and</u> blood in endocrine system ; 4 effects are / target is, specific / localised, in nervous system <u>and</u> (can be) widespread in endocrine system ; 5 effect / response, happens quickly in nervous system and slowly in endocrine system ; 6 effect / response, lasts a short time in nervous system <u>and</u> long time in endocrine system ; 7 AVP ;				
5(c)(i)	C ;				
5(c)(ii)	B ;				
5(c)(iii)	1 (D / it), shortens / contracts / decreases ; and any three from: 2 calcium ions / Ca²⁺, bind to troponin ; 3 tropomyosin, moves / shifts position / exposes binding sites on actin ; 4 myosin (head) binds to actin / myosin-actin cross-bridges form ; 5 power stroke / myosin head, pulls actin ; 6 more actin, enters / overlaps with, A band / B or more overlap between actin and myosin ;				
8(a)	any four from: 1 (Liberty Link soybean / it, is) not harmed by / not killed by / resistant to, herbicide / glufosinate ; 2 herbicide / glufosinate, kills, weeds / unwanted plants ; 3 reduces / removes / less / no, <u>competition</u> (with, weeds / unwanted plants) ; 4 <i>ref. to</i> (sun)light / water / (named) <u>soil</u> minerals ; 5 higher yield or more crop, harvested / produced ; 6 AVP ;				
8(b)(i)	restriction, enzyme / endonuclease ;				
8(b)(ii)	(DNA) ligase ;				
8(c)	any three from: <i>some / other / 21, countries:</i> 1 may, have, unsuitable / described problem in, climate / weather / soil ; 2 no regulatory approval / may have banned (GM / Liberty Link) ; 3 may have, (activist) groups / people, opposed to GM crops ; 4 may not have land space available ; 5 may have banned, herbicide / glufosinate ; 6 AVP ;				