



EXAM PAPERS PRACTICE

Grey Matter -1

Name: _____

Class: _____

Date: _____

Time:

Total Marks Available:

Total Marks Archived:

Level: Edexcel A level Biology

Subject: Biology

Exam Board: Pearson Edexcel Level 3 GCE AS and A level Biology A (Salters-Nuffield) and also Pearsons Edexcel AS and A Level Biology B (9BI0) - Is however suitable for use by AS and A level Biology Students of other Boards

Topic: Grey Matter -1

Type: Mark Scheme

To be used by all students preparing for Edexcel AS and A level Biology A and Biology B - Students of other Boards may also find this useful



Mark Scheme

Q1.

Question Number	Answer	Additional Guidance	Mark
	<p>A description that makes reference to three of the following:</p> <ul style="list-style-type: none">• ocular dominance columns (develop in visual cortex) (1)• neurones form synapses with these { cells / columns } (1)• { stimuli / action potentials / impulses } along neurones required to strengthen connections (with cells of ocular dominance columns)• stimulation during the critical period is needed to form (effective) connections in the visual cortex	<p>ALLOW columns of (target) cells</p> <p>ALLOW more synapses for stronger connections OR connections become weaker if stimuli not received</p>	<p>(3)</p>



Q2.

Question Number	Answer	Additional Guidance	Mark
	In sensory neurone: 1. dendron longer; 2. dendron myelinated ; 3. axon shorter ; 4. {cell body / eq} {not at the end / towards the middle / to the side / eq } ; 5. reference to no {motor end plate / eq} ;	ALLOW converse for motor neurone 4. ACCEPT centron / nucleus for cell body	(3)

Q3.

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Question Number	Answer	Additional Guidance	Mark
	A description that makes reference to the following: <ul style="list-style-type: none">• antagonistic (interaction) of muscles (1)• in the iris (1)• radial muscles contract and circular muscles relax (1)		(3) Exp



Q4.

Question Number	Answer	Additional guidance	Mark
(i)	<p>An explanation that makes reference to three of the following:</p> <ul style="list-style-type: none">• (DNA) ligase (joins the two genes) (1)• by joining phosphate to sugar / forming phosphodiester bonds (1)• by condensation reactions (1)• description of role of active site of enzyme (1)		(3)





EXAM PAPERS PRACTICE

Question Number	Answer	Mark
(ii)	<p>The only correct answer is D restriction endonuclease</p> <p><i>A is not correct because DNA polymerase catalyses the formation of new DNA strands</i></p> <p><i>B is not correct because RNA ligase joins sections of RNA</i></p> <p><i>C is not correct because RNA polymerase catalyses the formation of pre-mRNA</i></p>	(1)

Question Number	Answer	Additional guidance	Mark
(iii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• so that only bacteria with the antibiotic resistance gene survive (1)• therefore, these bacteria will also have the gene for spider silk (1)		(2)

Question Number	Answer	Additional guidance	Mark
(iv)	<p>An answer that makes reference to two of the following:</p> <ul style="list-style-type: none">• IAA to cause cell elongation (1)• detail of how IAA affects plant cells (1)• to grow plants that produce spider silk (1)	<p>ALLOW alters pH of cell wall / makes cellulose cellwall more plastic / effect on transcription</p> <p>ALLOW stimulates roots to grow</p>	(2)



EXAM PAPERS PRACTICE

Question Number	Answer	Additional guidance	Mark
(v)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none">• mass per acre per year for goats (1)• correct calculation of difference in mass of spider silk produced (1)• correct percentage increase (1)	<p>Example of calculation</p> $10 \times 12 = 120 \text{ (kg per acre per year)}$ $218 - 120 = 98 \text{ (kg per acre per year)}$ $81.66 / 81.7 / 82 \text{ (\%)}$ <p>Correct answer with no working gains fullmarks</p>	(3)



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Q5.

Question number	Answer	Additional guidance	Mark
(i)	<p>A description that makes reference to two of the following points:</p> <ul style="list-style-type: none">• MDMA { stimulates release / prevents re-uptake / increases concentration } of serotonin (1)• blocking pre-synaptic receptors / binding to post synaptic receptors (1)• nerve pathways using serotonin are more likely to be stimulated / more action potentials produced (1)	<p>ALLOW reference to dopamine instead of serotonin</p> <p>ALLOW more impulses generated</p>	(2)

Question number	Answer	Additional guidance	Mark
(ii)	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none">• MDMA use results in depletion of serotonin (1)• post synaptic membrane becomes less responsive to serotonin / loss of receptors on post synaptic membrane (1)• serotonin levels affect mood / lack of serotonin associated with depression (1)	<p>ALLOW dopamine instead of serotonin for all points</p>	(2)



Q6.

Question Number	Acceptable Answer	Additional Guidance	Mark
(i)	$58 - 45 = 13$ $(13 \div 58) \times 100$ (1) $= 22.4\%$ (1)		(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
(ii)	An answer that makes reference to the following: <ul style="list-style-type: none">• mass higher in A (compared with B) for both studies (1)• the difference is less in repeat study / mass lower in repeats (of both A and B (1)		(2)

Q7.



Question Number	Acceptable Answer	Additional Guidance	Mark
	An answer that makes reference to four of the following points: <ul style="list-style-type: none">• plants grown in pots containing same {soil / pH / minerals / water} as these factors can affect growth (1)• one group under lamp emitting red light and one group under a lamp emitting far red light / one group under lamp emitting red and far red light at same intensity and one group under lamp emitting far red light at higher intensity than red(1)• keep temperature the same in both as enzymes involved in growth (1)• reference to {several groups of pots / multiple plants} to ensure results are {reliable / suitable for valid statistical analysis} (1)• use {cloned / genetically identical} plants of same species as genes can affect growth (1)		(4)



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Q8.



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EXAM PAPERS PRACTICE

Question Number	Answer	Mark
(i)	<ul style="list-style-type: none">• C -60 millivolts <p><i>The answer is not A as - 80 millivolts is the maximum hyperpolarisation</i></p> <p><i>The answer is not B as - 70 millivolts in the resting potential</i></p> <p><i>The answer is not D as + 40 millivolts is the action potential</i></p>	(1) Comp

Question Number	Answer	Additional Guidance	Mark
(ii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• voltage gated sodium ion channels open and sodium ions {diffuse into /move in } from outside the cell (1)• (therefore causing an) increase in sodium ion concentration (1)• voltage gated potassium ion channels open and potassium ions {diffuse out / move out} from the inside (1)• (therefore causing an) decrease in potassium ion concentration at or after { 7 milliseconds / 40 mV } (1)	<p>ALLOW sodium gates for voltage gated sodium ion channels</p> <p>ALLOW decrease in potassium ion concentration with repolarisation</p>	(4) Exp



Question Number	Answer	Additional Guidance	Mark
(iii)	<p>An explanation that makes reference to three of the following:</p> <ul style="list-style-type: none">potassium ions (continue) leaving the {axon / cytoplasm} (1)(therefore) preventing another depolarisation occurring / it is the refractory period (1)allowing time for the neurone to reset (1)so that nerve impulses travel in one direction only (1)	<p>ALLOW voltage gated potassium ion channels remain open</p> <p>ALLOW prevents an action potential from being generated</p> <p>ALLOW time to return to resting potential</p>	(3) Exp



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Q9.

Question number	Answer	Additional guidance	Mark
	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none">• the benefits of the research outweigh any harm done (1)• need to carry out experiments on animals with a well-developed CNS (1)	<p>ALLOW CNS and spinal cord injuries are difficult to treat / CNS and spinal cord injuries have serious impact on people's lives / important research</p> <p>ALLOW experiments on tissues or invertebrates would not be sufficient</p> <p>IGNORE better than using humans / humans have more rights etc</p> <p>IGNORE have similar immune system / have less well developed nervous system</p>	<p>(2)</p>



Q10.

Question number	Answer	Additional guidance	Mark
	<p>An answer that makes reference to four of the following:</p> <p>Argument in favour</p> <ul style="list-style-type: none">• a utilitarianism – the overall benefits of the experiments are greater than any harm done (1)• welfare argument - animals can be used if they are treated well as far as possible (1) <p>Argument against</p> <ul style="list-style-type: none">• rights argument - all animals have rights (not just humans) (1)• results may not be applicable to humans (1)• consent argument - animals are unable to give consent (as is required for human trials) (1)	<p>e.g. animals can be used if their use is regulated</p> <p>e.g. it is not acceptable to keep animals in laboratory cages / not acceptable to cause pain suffering to mice</p>	<p>Expert (4)</p>



Q11.

Question Number	Acceptable Answer	Additional Guidance	Mark
(i)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none">• utilitarian argument, better to test on animals than on humans (1)• the benefits to humans must outweigh harm done to other animals (1)		(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
(ii)	<p>An explanation that makes reference to two of the following:</p> <ul style="list-style-type: none">• to determine safe dose (1)• to determine side effects (1)• to determine how the drug is metabolised (1)		(2)



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Q12.



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Question number	Answer
	<p>Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme.</p> <p><u>Indicative content:</u></p> <p><u>Benefits</u></p> <p>Described:</p> <ul style="list-style-type: none">• crops have increased yield due to pest control or resistance to disease• reduced need to use pesticides• crops can be grown in a wider range of conditions, e.g. harsh conditions, drought etc <p>Discussed:</p> <ul style="list-style-type: none">• hybridisation could allow crop plants to have genes for tolerance to harsh conditions from genome D• crops have higher nutrient content, or produce a greater range of useful chemicals e.g. pharmaceutical products• genetic modification can be beneficial if crops are resistant to herbicides - crops can be sprayed with herbicide without { being harmed / causing reduction in yield } <p><u>Risks</u></p> <p>Hybridisation:</p> <ul style="list-style-type: none">• hybridisation can lead to pest species which have ability to grow in wide range of conditions• hybridisation could allow genes for tolerance to harsh conditions from genome D to enter pest species <p>GM:</p> <ul style="list-style-type: none">• genetic modification may result in genes entering pest species, making control difficult or into food chains• GM can introduce antibiotic resistant genes to other species <p>Selective breeding</p> <ul style="list-style-type: none">• selective breeding reduces { genetic diversity / size of gene pool }, or causes genetic drift• leading to loss of useful alleles / reducing the ability of the crops to adapt to environmental change



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Level	Mark	Descriptor	Additional Guidance
0	0	No awardable content	
1	1-2	Limited scientific judgement made with a focus on one side of the argument only. A conclusion may be attempted, demonstrating isolated elements of biological knowledge and understanding but with limited evidence to support the judgement being made.	Only considered one benefit or one risk without further explanation beyond a brief description.
2	3-4	A scientific judgement is made through the application of relevant evidence to both sides of the argument. A conclusion is made, demonstrating linkages to elements of biological knowledge and understanding, with occasional evidence to support the judgement being made.	Considers at least one risk and one benefit with some discussion.
3	5-6	A scientific judgement is made, which is supported throughout by sustained application of relevant evidence from the analysis and interpretation of the scientific information. A conclusion is made, demonstrating sustained linkages to biological knowledge and understanding with evidence to support the judgement being made.	Benefits generally described and specific risks discussed. Conclusions described for each of the three methods – hybrids, GM and selective breeding.



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Q13.



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Question Number	Acceptable Answer	Additional Guidance	Mark
(a)	pyruvate and { reduced coenzyme / reduced NAD }		(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
(b)(i)	A description that makes reference to the following: <ul style="list-style-type: none">• Final electron acceptor		(1)



Question Number	Acceptable Answer	Additional Guidance	Mark
(b)(ii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• carbon monoxide binds to cytochrome oxidase (1)• prevents oxygen binding to the enzyme (1)• blocks the electron transport chain / prevents oxidation of reduced electron carriers (1)		(3)



EXAM PAPERS PRACTICE

Question Number	Acceptable Answer	Additional Guidance	Mark
(c)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• NO binds to cytochrome oxidase in endothelium (of blood vessels) (1)• diverts oxygen to smooth muscle cells (1)• contraction of muscle cells causes vasoconstriction in arterioles (1)		(3)

E



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Question Number	Acceptable Answer	Additional Guidance	Mark
(d)	<p>An answer that makes reference to three of the following:</p> <ul style="list-style-type: none">• free radicals interact with transcription factors (1)• activation of gene for P53 (1)• production of mRNA from activated gene (1)		

Question Number	Acceptable Answer	Additional Guidance	Mark
	<ul style="list-style-type: none">• translation of mRNA resulting in synthesis of P53 on ribosomes (1)		(3)



Question Number	Acceptable Answer	Additional Guidance	Mark
(e)	<p>A description that makes reference to three of the following:</p> <ul style="list-style-type: none">• inner membrane { is folded / has a larger surface area / has cristae } (1)• outer membrane is impermeable to H⁺ ions (1)• only inner membrane contains { ETC (proteins) / ATP synthase / stalked particles} (1)• only inner membrane contains H⁺ pump (1)		(3)



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Question Number	Acceptable Answer	Additional Guidance	Mark
(f)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none">• myocardial infarction causes cell death in the heart (1)• due to lack of oxygenated blood reaching cardiac muscle cells (1)• NIR affects cytochrome oxidase involved in aerobic respiration (1)• diversion of oxygen to cardiac muscle cells would reduce death of these cells (1)		(4)



Question Number	Acceptable Answer	Additional Guidance	Mark
(g)(i)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none">• restriction endonuclease enzyme (1)• extraction of gene that codes for light-sensitive protein (1)• use of a suitable vector (1)• insertion of gene into the { genome / DNA } in the nucleus of the neurone (1)		(4)



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Question Number	Acceptable Answer	Additional Guidance	Mark
(g)(ii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• { depolarisation / action potential } occurs (1)• (nerve) impulse reaches { synapse / presynaptic membrane } (1)• calcium ion channels open causing calcium ions to enter presynaptic neurone (1)• vesicles containing neurotransmitter fuses with presynaptic membrane (1)• neurotransmitter released (1)		(5)



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Question Number	Acceptable Answer	Additional Guidance	Mark
(h)	<p>An explanation that makes reference to three of the following:</p> <ul style="list-style-type: none">• fMRI detects changes in blood flow in the brain (1)• MRI signal reflects state of haemoglobin / magnetic fields repelled by oxygen rich blood / deoxygenated haemoglobin more magnetic than oxygenated haemoglobin (1)• allows areas of greater brain activity to be detected as an image created by magnetic resonance (1)• areas of the brain that are involved in an auditory memory task { were using more oxygen / had an increased flow of blood } (1)		(3)



Q14.

Question number	Answer	Additional guidance	Mark
	<p>An explanation that makes reference to four of the following:</p> <ul style="list-style-type: none">• potential difference across axon changing (1)• due to increased permeability to sodium ions / (voltage gated) sodium channels open (1)• sodium ions { move into the axon / cause depolarisation } (1)• (followed by) an increased permeability to potassium ions / potassium channels open (1)• potassium ions { move out of the axon / cause repolarisation of the membrane } (1)	<p>e.g. when depolarised from negative to positive or from -70mV to +40mV or repolarised from +40mV to -70mV</p>	(4)



EXAM PAPERS PRACTICE

Q15.

Question Number	Answer	Additional Guidance	Mark
(i)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">changing a base results in a change in the triplet codethis changes the codon(s) in the mRNAresulting in a different { amino acid / amino acid sequence } (in the primary structure)	<p>ALLOW deletion / substitution / insertion / frameshift. ALLOW illustration of change in triplet code e.g. ATT to ATG</p> <p>ALLOW introducing a stop codon / terminating translation</p>	(3)

Question Number	Answer	Additional Guidance	Mark
(ii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">sequence the genome of people with MPS1sequence the genome of a number of people without the conditioncompare the base sequences to identify mutations found only in individuals with the condition	<p>ALLOW comparison of base sequences of people with MPS1 and people without MPS1</p>	(3)



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Q16.

Question Number	Answer	Additional Guidance	Mark
	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• no difference in action potential between individual with and individual without GBS• motor neurone conduction speed is reduced• due to { loss of myelin / demyelination } of the (motor) neurone• (and therefore) loss of saltatory conduction	<p>IGNORE reference to sensory neurone</p> <p>ALLOW reference to loss of Schwann cells DO NOT ALLOW destroy</p> <p>ALLOW impulse cannot pass between the nodes of Ranvier</p>	(4)

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Q17.

Question Number	Answer	Additional Guidance	Mark
	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• drugs not delivered to { other / healthy } tissues (1)• overall dosage needed is less (1)	<p>ALLOW drug does not {affect / reach} other tissues, drug not delivered to the whole body ALLOW converse</p> <p>ALLOW {higher concentration / more of the drug} delivered to area where needed</p>	(2)



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Q18.



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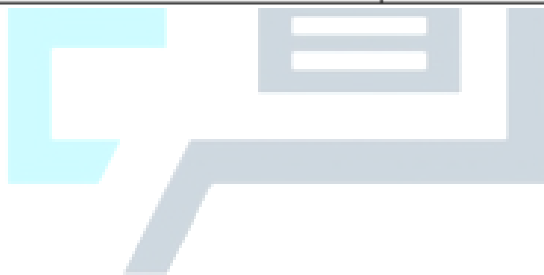
Question Number	Answer	Additional guidance	Mark
(i)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">plants respond to light / plants show phototropic responses (1)(therefore) light must be excluded in order to study the effects of gravity (1)(putting plants in the dark) therefore prevents light having an effect (1)	<p>ALLOW plant shoots grow towards light</p> <p>ALLOW 'geotropism' for 'effects of gravity'</p> <p>ALLOW to control light</p>	(3)

Question Number	Answer	Additional guidance	Mark
(ii)	<ul style="list-style-type: none">correct values selected from the graphs (1)correct calculation of mean rate of curvature with units (1)	<p><u>Example of calculation</u></p> <p>58 and 9</p> <p>$49 \div 23 = 2.1$ {degrees per day / ° day⁻¹}</p> <p>ALLOW 2.13 degrees per day</p> <p>Correct answer without working gains full marks</p> <p>Correct value without units gains 1 mark</p>	(2)



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Question Number	Answer	Additional guidance	Mark
(iii)	<p>An answer the makes reference to two of the following:</p> <ul style="list-style-type: none">do not have allele conferring ability to respond to gravity / only have alleles that confer a lack of response to gravity (1)(so) do not produce {IAA / auxin} (1)(therefore) lack of stimulation of cell elongation on side of stem facing downwards (1)	<p>ALLOW cells present in the stem fail to detect gravity</p> <p>ALLOW there is no auxin present</p>	(2)



Q19.

Question number	Answer	Additional guidance	Mark
	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none">sequencing the {genome / genes / DNA} of people with (and without) ASD (1)identify (genes that have) {mutations / differences in sequence} (between ASD and non-ASD individuals) (1)	<p>ALLOW compare genomics of people with and without ASD</p> <p>ALLOW DNA profiling of people with ASD</p>	Expert (2)



Q20.

Question Number	Answer	Mark
	<ul style="list-style-type: none">• Diagram C <p><i>The answer is not diagram A because the labelled regions do not match the descriptions</i></p> <p><i>The answer is not diagram B because the labelled regions do not match the descriptions</i></p> <p><i>The answer is not diagram D because the labelled regions do not match the descriptions</i></p>	(1) comp

Q21.

Question Number	Answer	Additional Guidance	Mark
(i)	A description that makes reference to the following: <ul style="list-style-type: none">• due to more activity (1)• an increase in { oxygenated blood / blood flow } to this region (1)• fMRI signals { reflected / not absorbed } by oxygenated blood (1)	ALLOW increased aerobic respiration ALLOW oxyhaemoglobin or oxygen-rich blood for oxygenated blood ALLOW oxyhaemoglobin or oxygen-rich blood for oxygenated blood	(3) Exp



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Question Number	Answer	Additional Guidance	Mark
(ii)	<p>A description that makes reference to three of the following</p> <ul style="list-style-type: none">• (using both provides information on) function (PET) and structure (1)• PET scan shows areas that are {more (metabolically) active / dividing more } (1)• CT scan gives {location / size} (1)• each scan uses a different technique / techniques described (1)	<p>ALLOW reference to 3D images (with PET and CT)</p> <p>e.g. CT uses X-rays and PET radioactively labelled metabolite such as glucose</p>	<p>(3) Exp</p>

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Q22.



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Question Number	Acceptable Answer	Additional Guidance	Mark
(a)(i)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none">• gene is a length of DNA that codes for a { polypeptide / protein } (1)• genome is a complete set of { DNA / introns and exons } (1)		(2)



EXAM PAPERS PRACTICE

Question Number	Acceptable Answer	Additional Guidance	Mark
(a)(ii)	ligase / integrase		(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
(a)(iii)	plasmid / virus		(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
(a)(iv)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none">transcription of DNA to mRNA (1){ translation of mRNA / protein synthesis } (1) on ribosomes		(2)



Question Number	Acceptable Answer	Additional Guidance	Mark
(b)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• no prothrombin activated so thrombin not produced (1)• thrombin needed to convert fibrinogen to fibrin (1)• fibrin needed to trap { platelets / blood cells } to form the (blood) clot (1)		(3)



EXAM PAPERS PRACTICE

Q23.



EXAM PAPERS PRACTICE



EXAM PAPERS PRACTICE

Question Number	Acceptable Answer	Additional Guidance	Mark
(a)	An explanation that makes reference to the following: <ul style="list-style-type: none">• fraternal twins risk is lower (1)• because fewer alleles in common (1)	Allow converse	(2)

Question Number	Acceptable Answer	Additional guidance	Mark
(b)(i)	An explanation that makes reference to the following: <ul style="list-style-type: none">• Identical twins being raised apart allows environmental factors to be investigated separately from genetic factors (1)• therefore may be able to determine relative amount of risk due to genetic variation / relative amount of risk due to environment (1)		(2)

Question Number	Acceptable Answer	Additional guidance	Mark
(b)(ii)	An answer that makes reference to the following: <ul style="list-style-type: none">• twins have more in common than shared genetics / shared uterine environment (1)• twins may be raised in similar environments(1)	Ignore reference to sample size	(2)



EXAM PAPERS PRACTICE

Question Number	Acceptable Answer	Additional guidance	Mark
(c)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• Parkinson's symptoms arise due to low dopamine levels (1)• transmission of nerve impulses disrupted causing lack of control of {muscle movements / tremors} (1)• schizophrenia drugs lower {neurotransmitter / dopamine} levels (1) <p>Plus two from:</p> <ul style="list-style-type: none">• therefore less dopamine in synaptic / knob secreted into cleft / diffuses across cleft (1)• therefore less dopamine available to bind to receptors (1)• therefore no/little change in membrane structure / permeability of post- synaptic cell (1)• therefore fewer sodium ions enter postsynaptic cell (1)• therefore less depolarisation of postsynaptic cell (1)		(5)



EXAM PAPERS PRACTICE

Q24.

Question Number	Answer	Mark
(a)	<ol style="list-style-type: none">1. reference to {restriction enzyme / endonuclease} ;2. to cut gene out of animal DNA ;3. idea of amplification using DNA polymerase (in PCR) ;4. (enzymes) open plasmid ;5. (same endonuclease) to produce 'sticky ends' /description / at selected base sequence ;6. H bonds formed between bases at 'sticky ends' ;7. ligase ;8. to join gene to plasmid / eq ;9. reference to {phosphodiester / eq} bond ;	(5)

Question Number	Answer	Mark
(b)	<ol style="list-style-type: none">1. (small) {circle /eq} of DNA ;2. containing bacterial (survival) genes and {protein / animal} gene ;3. marker gene / description given ;	(2)



EXAM PAPERS PRACTICE

Question Number	Answer	Mark
(c)	<ol style="list-style-type: none">1. idea of easier to manage growth e.g. do not need sterile conditions ;2. idea that it is safer (than bacteria) ;3. idea of more protein can be made /eq ;4. bacteria may not have correct amino acids to make protein / eq ;5. idea that it could produce edible drugs ;6. idea that plants have introns/bacteria do not so gene does not need modifying ;7. idea that it is cheaper ;	(2)

Question Number	Answer	Mark
(d)	<ol style="list-style-type: none">1. idea of gene transfer to other {species / eq} ;2. idea of consequence of transfer e.g. resistance to pesticide / antibiotics, superweeds ;3. idea of possible harmful effects from genes e.g. biochemical changes to substances that could act as allergens, long term effects of consuming ;4. idea that benefit focused on developed countries / converse ;5. idea of risk related to use of viral vectors ;6. idea of effect on organic farmers ;	(2)



Q25.

Question Number	Answer	Additional Guidance	Mark
	An answer that makes reference to the following: <ul style="list-style-type: none">all the {DNA / exons and introns} (1)	DO NOT ALLOW 'all the genes in the DNA' / 'all the DNA in the genes'	(1)

