PEARSON EDEXCEL GCSE COMBINED SCIENCE (HIGHER) · 1SC0

BIOLOGY



MARK SCHEME

TOPIC 2: CELLS AND CONTROL (PAPER 1, PACK 2)

SCORE	PERCENTAGE
/16	%

STEMUP

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Mark Scheme

Q1.

	Answer	Acceptable answers	Mark
(i)	0.5 / 0.5 picogram	Accept: 0.5 picograms accept: the same (mass) as the sperm cell	**(1)**
(ii)	**C** haploid		**(1)**
(iii)	**A** thymine with adenine, cytosine with guanine		**(1)**
(iv)	weak hydrogen bonds / hydrogen bonds / hydrogen (1)	H (bond)	**(1)**

Q2.

Question number	Answer	Additional Guidance	Mark
	(makes cell division) uncontrolled	accept idea of cell division being rapid / increased ignore references to mutation / tumour	**(1)** **A01 1**

Q3.

Question Number	Answer	Mark
(i)	structure A – dendron / dendrite structure B – nucleus answers must be in the correct order	**(2)**

Question Number	Answer	Acceptable answers	Mark
(ii)	**B** ☒ electrical impulses		**(1)**

Question Number	Answer	Acceptable answers	Mark
(iii)	A description to include: **insulates** the (electrical) impulse / **insulates** the {axon / neurone} (from surrounding tissue) (1) allows quicker (electrical) conductance (1)	accept: speeds up transmission / sends {impulses / signals} faster ignore references to protection of the axon ignore reference to messages	**(2)**

Question Number	Answer	Mark
iv	synapse(s) / synaptic cleft / synaptic gap	**(1)**

Q4.

	Answer	**Acceptable answers**	**Mark**
(i)	(67 + 60+ 62) = 189 (1) (189) / 3 ans = 63 (ms) (1)	Two marks for correct bald answer ECF for incorrect calculation carried out correctly.	**(2)**

(ii)	An explanation to include the following points: alcohol is a depressant (1) slows down the activity of the brain (1) (slows down) neurotransmission (1) (slows down) transmission at the synapse (1)	**Reject** stimulant (no further marks awarded) **Ignore** references to CNS accept sedative accept: slows reactions / reactions take longer / reaction time increases	**(2)**

Q5.

Question Number	Answer	Acceptable answers	Mark
(a)(i)	Correct substitution i.e. (-0.5 ÷ 10.3) x 100 (1) - 4.85 / - 4.9	Accept data correctly put into other acceptable methods. Accept answer with more decimal places eg: - 4.8543 / - 4.854368932 Full marks for correct bald answer award max of one mark if negative is not written eg 4.85 / 4.9	**(2)**

Question Number	Answer	Acceptable answers	Mark
(a)(ii)	better / easier / more valid comparison can be made between values /can make more valid conclusion / because the original / starting masses of potato were not the same / Idea of easier to visualise the size of the change	Ignore makes the results / test reliable / accurate	**(1)**

Question Number	Answer	Acceptable answers	Mark
(b)	A description including the following: • Produce two (daughter) cells • which are **genetically** identical • and diploid	Accept DNA for chromosomes throughout Also credit details of the process of mitosis chromosomes replicates (1) spindle fibres form / chromosomes attached to spindle (1) Chromosomes arranged on equator / middle of cell / chromosomes pulled apart /pulled to poles /separation of sets of chromosomes (1) Idea of nucleus reforming / New cell wall formed (to divide cell) / cytokinesis / description of cytokinesis (1)	**(3)**

Question Number		Indicative Content	Mark
QWC	* **(c)**	A explanation to include some of the following points • active transport requires energy • (active transport moves mineral ions) from the soil • into root (hair cells) • reference to pumps (in the cell membranes) • from a low concentration to a high concentration/against their concentration gradient • reference to mineral ions / mineral salts accept named minerals eg nitrates • diffusion is a passive process • gases diffuse from high to low concentration/down their concentration gradient • gas exchange in the leaf occurs by diffusion • carbon dioxide diffuses in • to air spaces in leaves / into cells • for photosynthesis / produces glucose • oxygen diffuses in • for respiration	**(6)**

Level	0	No rewardable content
1	1 - 2	• a limited explanation that gives information about active transport **OR** diffusion in the correct context e.g. minerals ions are transported into root (hair cells) • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	3 - 4	• a simple explanation that gives details of active transport or diffusion transporting materials e.g. carbon dioxide diffuses into leaves down their concentration gradient OR a limited explanation of both active transport and diffusion • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy
3	5 - 6	• a detailed explanation that describes **both** processes e.g. active transport requires energy to transport mineral ions into the root hair cell AND carbon dioxide diffuses into the leaf for photosynthesis • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors

Q6.

Question number	Answer	Additional guidance	Mark
	Select 45 cells in mitosis (1) (45) ÷ 89 x 100 = 50.561 (1) 50.6	Award full marks for correct answer with no working ecf for workings that show the use of an incorrect number of cells up to and including 89 cells ecf if the workings show their answer to 3 s.f.	**(3)** **A03 2ab**