PEARSON EDEXCEL GCSE BIOLOGY (HIGHER) · 1BI0

BIOLOGY



MARK SCHEME

TOPIC 2: CELLS AND CONTROL (PACK 1)

SCORE	PERCENTAGE
/62	%

STEMUP

These questions belong to Pearson Edexcel, not to us.

The examination questions, mark schemes and examiner comments in this pack were written and published by Pearson Edexcel. They are past assessment materials, reproduced here so that students can revise from them.

What we do not own

STEMUP is not affiliated with Pearson Edexcel and does not own, and makes no claim to own, any of the question, mark scheme or examiner report material in this pack. Pearson Edexcel has not endorsed, approved or been involved in the production of it. Pearson Edexcel and the qualification titles used here belong to their respective owners and appear for identification only.

Where to find the originals

Pearson Edexcel publishes its past papers, mark schemes and examiner reports. Always check the current specification at qualifications.pearson.com before you revise, because content and wording can change between series.

If you hold the rights to any material in this pack and would like it amended or removed, contact admin@stemup.co.uk and we will act on it.

Mark Scheme

Q1.

Question number	Answer	Additional guidance	Mark
(i)	Any **one** from: • pig kidneys cannot be used in humans (1) • pig kidneys would be rejected (by humans) (1) • to prevent competition between the pig and the human organ (1) • so the human kidneys form properly (1)	 ignore so it grows human kidneys accept so there is room for the human kidneys	**(1)** **AO2 1**

Question number	Answer	Mark
(ii)	An explanation linking **two** from: • stem cells {are undifferentiated / are unspecialised / can differentiate / become specialised / form any type of cell} (1) • so can produce the {kidney / kidney cells / kidney tissue} (1) • that won't be rejected (when transplanted) (1)	**(2)** **AO1 1**

Q2.

Question number	Answer	Mark
i)	A description that combines analysis via a judgement (1 mark) to reach a conclusion (1 mark): • as the caffeine dosage increases from 100mg to 300mg mean reaction time decreases (1) • little / no further effect on reaction time above 300mg dosage (1)	**(2)**

Question number	Answer	Mark
ii)	Any two from: • volunteers to be standardised e.g. gender, mass, age • include a control e.g. volunteer with no caffeine, reaction time before drinking • include interim concentrations of caffeine e.g. 200mg, 400mg	(2)

Q3.

Question Number	Answer	Additional Guidance	Mark
(i)	(8 x 4) = 32 (grams of alcohol) (1) 1.2 / 1.20 (x risk)	award full marks for the correct answer with no workings	(2) AO3

Question Number	Answer	Additional Guidance	Mark
(ii)	An answer including two from: • mutations in DNA (1) • cell division is uncontrolled (1) • leading to the formation of a tumour / growth / mass of cells (1)	accept change in the gene/cell mutates accept {rapid / continuous} cell division	(2) AO2 1

Q4.

Question number	Answer	Additional Guidance	Mark
(i)	$2.0 \times 10^8 - 1.6 \times 10^7$ / 200 000 000 – 16 000 000 /184 000 000 (1) 1.84×10^8 / 1.8×10^8	award full marks for correct answer **accept 18.4×10^7 or 18×10^7 for 1 mark**	**(2)** AO2(1)

Question number	Answer	Additional guidance	Mark
(ii)	An explanation linking: • (myelination) speeds up impulses (1) • insulates the {axon/neurone} (1) • motor neurones transmit information from the CNS / motor neurones transmit information to effectors / neurones in the brain connect to other neurones in the brain (1) • (motor neurones) transmit information over a greater distance (than neurones in the brain) (1)	 accept signals/messages for impulses accept brain/spinal cord/relay neurone for CNS accept muscles/ glands for effectors accept idea that motor neurones can be part of a reflex so need quick impulses (1)	**(3)** AO2(1)

Q5.

Question number	Answer	Additional Guidance	Mark
(i)	$2.0 \times 10^8 - 1.6 \times 10^7$ / 200 000 000 – 16 000 000 /184 000 000 (1) 1.84×10^8 / 1.8×10^8	award full marks for correct answer **accept 18.4×10^7 or 18×10^7 for 1 mark**	**(2)** AO2(1)

Question number	Answer	Additional guidance	Mark
(ii)	An explanation linking: • (myelination) speeds up impulses (1) • insulates the {axon/neurone} (1) • motor neurones transmit information from the CNS / motor neurones transmit information to effectors / neurones in the brain connect to other neurones in the brain (1) • (motor neurones) transmit information over a greater distance (than neurones in the brain) (1)	accept signals/messages for impulses accept brain/spinal cord/relay neurone for CNS accept muscles/ glands for effectors accept idea that motor neurones can be part of a reflex so need quick impulses (1)	**(3)** AO2(1)

Q6.

Question number	Answer	Additional guidance	Mark
(i)	0.035 ÷ 5 = 0.007 (1) 7 / -7 (ms)	award two marks for correct answer with no working accept 0.033 ÷ 4 =0.008 for 1 mark if working shown accept 8 / -8 (ms) for 2 marks if working shown. allow ecf for incorrect mean converted into ms for 1 mark	**(2)** **AO2 1**

Question number	Answer	Additional guidance	Mark
(ii)	Any two from: • test the drink on more people / different people (1) • more repeats on the same people (1) • repeat using different volumes of the drink (1) • repeat using different times between drinking and the test (1) • repeat the experiment with just water (1) • control other environmental factors/named factors (1)	 accept different amounts accept use a control/use a placebo accept tiredness/health/drug intake/food intake	**(2)** **AO3 3b**

Q7.

Question number	Answer	Additional guidance	Mark
(i)	0.035 ÷ 5 = 0.007 (1) 7 / -7 (ms)	award two marks for correct answer with no working accept 0.033 ÷ 4 =0.008 for 1 mark if working shown accept 8 / -8 (ms) for 2 marks if working shown. allow ecf for incorrect mean converted into ms for 1 mark	**(2)** **AO2 1**

Question number	Answer	Additional guidance	Mark
(ii)	Any two from: • test the drink on more people / different people (1) • more repeats on the same people (1) • repeat using different volumes of the drink (1) • repeat using different times between drinking and the test (1) • repeat the experiment with just water (1) • control other environmental factors/named factors (1)	 accept different amounts accept use a control/use a placebo accept tiredness/health/drug intake/food intake	**(2)** **AO3 3b**

Q8.

Question number	Answer	Additional guidance	Mark
(i)	(292 + 301 + 297) = 890 (1) (890÷3) 296.7 (1) given to 3 s.f. (1) 297	full marks for correct answer with no working ecf from mp1 allow 296.67 or answers correct to any number of decimal places for 2 marks including the dot to show recurring numbers. ecf from mp2 accept 296 for 2 marks award 1 mark for 296.6/ 296.66	**(3)** AO2

Question number	Answer	Additional guidance	Mark
(ii)	Any one from: • as age increases focusing distance increases /ORA (1) • as age increases people {become more long-sighted / cannot see objects close up clearly} / ORA (1) • different people of the same age have different focusing distances (1)	accept a conclusion that links age group to a focus distance ignore cannot see objects in the distance	**(1)** AO3 2a

Question number	Answer	Additional guidance	Mark
(iii)	Any two from: • use more people / repeat the test (with more people) (1) • use more ages (1) • repeat the test for each person (1) • controlling a variable in the people selected (1) • reference to no other eye defect / health issues (1) • controlling {external environment / test used} (1)	accept named variable e.g. sex ignore defects in distance vision accept named factors e.g. light levels / same book / same font	**(2)** AO3/3b

Q9.

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**

Q10.

Question Number	Answer	Additional Guidance	Mark
(i)	(8 x 4) = 32 (grams of alcohol) (1) 1.2 / 1.20 (x risk)	award full marks for the correct answer with no workings	**(2)** **AO3**

Question Number	Answer	Additional Guidance	Mark
(ii)	An answer including two from: • mutations in DNA (1) • cell division is uncontrolled (1) • leading to the formation of a tumour / growth / mass of cells (1)	 accept change in the gene/cell mutates accept {rapid / continuous} cell division	**(2)** **AO2 1**

Q11.

Question number	Answer	Additional Guidance	Mark
	Any three from: • mitosis produces 2 cells and meiosis produces 4 cells (1) • mitosis produces **genetically** identical cells and meiosis produces **genetically** different cells (1) • mitosis produces diploid cells and meiosis produces haploid cells (1) • mitosis produces body cells and meiosis produces {gametes /sex cells} (1)	accept offspring for cells mitosis is involved in asexual reproduction and meiosis is involved in sexual reproduction (1)	**(3)** AO1 1

Q12.

Question number	Answer	Additional Guidance	Mark
	Any three from: • mitosis produces 2 cells and meiosis produces 4 cells (1) • mitosis produces **genetically** identical cells and meiosis produces **genetically** different cells (1) • mitosis produces diploid cells and meiosis produces haploid cells (1) • mitosis produces body cells and meiosis produces {gametes /sex cells} (1)	accept offspring for cells mitosis is involved in asexual reproduction and meiosis is involved in sexual reproduction (1)	**(3)** AO1 1

Q13.

Question Number	Answer	Additional guidance	Mark
(i)	A description including **three** from: • the impulse (in the relay neurone) triggers the release of a chemical (1) • neurotransmitter (1) • (neurotransmitter) **diffuses** (1) • across the synapse (1) • new impulse triggered in {motor neurone / next neurone} (1)	accept chemical messenger accept across the gap	**(3)** **AO1 1**

Question Number	Answer	Additional Guidance	Mark
(ii)	An explanation linking **two** from: • a process that occurs in response to danger (1) • which bypasses the {brain / parts of the brain} / is an {involuntary process / subconscious process} (1) • so there is a faster transmission (of electrical impulses) / faster response / allows a quick reaction (1) • to protect the body from harm (1)	accept goes to the spinal cord accept react without thinking accept examples of actions to protect the body e.g. pulling hand away	**(2)** **AO1 1**

Q14.

Question Number	Answer	Additional guidance	Mark
(i)	A description including **three** from: • the impulse (in the relay neurone) triggers the release of a chemical (1) • neurotransmitter (1) • (neurotransmitter) **diffuses** (1) • across the synapse (1) • new impulse triggered in {motor neurone / next neurone} (1)	accept chemical messenger accept across the gap	**(3)** **AO1 1**

Question Number	Answer	Additional Guidance	Mark
(ii)	An explanation linking **two** from: • a process that occurs in response to danger (1) • which bypasses the {brain / parts of the brain} / is an {involuntary process / subconscious process} (1) • so there is a faster transmission (of electrical impulses) / faster response / allows a quick reaction (1) • to protect the body from harm (1)	accept goes to the spinal cord accept react without thinking accept examples of actions to protect the body e.g. pulling hand away	**(2)** **AO1 1**

Q15.

Question number	Answer	Additional guidance	Mark
(i)	An answer including: • light rays {refracted / bent} {at the cornea /by the lens} (1) • (light rays) {converge / focus} on the retina / focal point is on the retina (1)	reject for references to light going through/refracted by the iris accept (refracted) onto the retina accept rods / cones for retina ignore back of the eye/optic nerve	**(2)** AO1

Question number	Answer	Additional guidance	Mark
(ii)	An explanation linking two from: • lens X which is a {diverging/concave lens} (1) • {lens X/a diverging lens/a concave lens} will {diverge/spread} out the light rays (1)	accept a {concave /diverging} lens reject lens Y	**(2)** **Exp** AO2