

APOLLO

Muscle and motility

HL

Biology

First assessment 2025

7 questions | mark schemes

Mark-scheme answers

Biology HL | Paper 1A | May 2025 TZ2 | Q25 | 1 marks

25. C

Biology HL | Paper 1A | May 2025 TZ3 | Q15 | 1 marks

15. D

Biology HL | Paper 1A | May 2025 TZ3 | Q23 | 1 marks

23. B

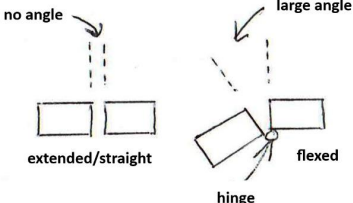
Biology HL | Paper 1A | Nov 2025 TZ3 | Q23 | 1 marks

23. B

2.	a	i	(joint) angle;	<i>Do not accept degrees alone (which are the units, not the variable).</i>	1
2.	a	ii	outliers;		1
2.	b		yes, as the results/medians/(IQR) ranges for both are very similar;	<i>Do not accept means instead of medians.</i>	1
2.	c		<i>Strengths (max 1)</i> a. large sample/range of results for both methods; b. many/three joints used; c. some variables were controlled; d. two methods of measurement; <i>Limitation</i> e. length of fingers/flexibility of joints not considered / OWTTE;	<i>Award marking points for the design of the experiment but not for analyzing the results.</i> a. Allow quoting the sample size (120). b. Results for all (MCP, PIP, DIP) are used. c. Accept named variables, e.g., left finger, healthy people. e. Accept other variables than left finger and healthy people.	2 max

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8825 – 6008M

Question		Answers	Notes	Total
2.	d	a. when extended/straight no/very small angle OR if joint completely straight the angle would be 0(°) OR all angles are measured relative to the extended joint / OWTTE; b. angle increases when finger flexes/bends /vice versa OR flexion creates an angle (compared to extended); c. (finger joints) act as hinge (joints) when flexed / OWTTE; d. joint/measuring device (seen from above) opens when flexed, so larger angle/OWTTE; e. measuring device could be goniometer / (video and) computer/app analysis of images / protractor on image; f. different measuring devices produce similar results / OWTTE;	a. Allow 0°/180°. Allow answers using annotated diagrams.  Allow alternative terms, such as bent, flexed, straight, etc.	3 max

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8825 – 6008M

Question	Answers	Notes	Total
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2.	a	towards the back of the hand/upwards/backwards;	Accept movement to the side if the hand is identified e.g. towards the left in the left hand. Accept clear description of the movement relative to the hand e.g. away from the palm. Do not accept only bending or flexing the finger. Direction must be included.	1
2.	b	(video and) computer/app analysis of images OR goniometer;	Accept use a protractor <u>on an image</u>. Do not accept protractor on its own.	1
2.	c	63 to 65 (for method 1 – lowest value) OR 79 to 81 (for method 1 – value on correlation line) OR 88 to 90 (for method 2);	Angle unit not required. Mark first answer only. Accept a value in the ranges given.	1
2.	d	ligaments/tendons;	.	1

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8825 – 6020M

Question	Answers	Notes	Total
2. e	strong/good/high correlation OR the two methods have good agreement;		1
2. f	Structure a. <u>lignified/lignin</u> in walls provides support/prevents collapsing/resists (negative) pressure/tension; b. polar walls allow for the adhesion of water molecules (for capillary action); Transport c. no cell contents/empty/hollow so transport is not impeded; d. end walls absent/incomplete/perforated for unimpeded flow OR long continuous tubes allowing for continuous column of water; e. pits/gaps/pores in walls allow (lateral) movement/entry and exit of water/minerals; f. small diameter allows for capillary action/tension in water column;	Each structure must include an explanation. a. Do not accept cellulose instead of lignin. b. Accept hydrogen bonding as indicating polar bonding to the walls through adhesive forces. e. Do not accept reference to osmosis but accept reference to water movement into/out of phloem.	3 max

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8825 – 6020M

Question	Answers	Notes	Total
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3.	a	a. providing energy/ATP OR for <u>aerobic respiration</u> ; b. for muscle contraction OR to break cross-bridges (between myosin heads and actin);	<i>b. can be awarded even if the answer states 'contraction and relaxation/lengthening'.</i>	2
3.	b	a. actin and myosin (filaments) slide over each other to shorten/contract the sarcomere/muscle OR sliding filament theory of muscle contraction; b. myosin in centre and actin at ends of sarcomere; c. myosin heads bind to actin/form cross-bridges/cross-linkages; d. myosin heads tilt/swivel OR myosin heads move/detach using (energy from) ATP; e. actin filaments moved towards the center of the sarcomere OR actin and myosin filaments overlap more;		3 max

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8825 – 6009M

Question	Answers	Notes	Total
3. c	a. attaches myosin to the Z-line / keeps myosin centred in the sarcomere; b. stores potential energy/elastic energy; c. helps sarcomeres recoil / enhances next muscle contraction/relaxation/lengthening; d. prevents overstretching/straining of the sarcomere/muscle;		2 max

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8825 – 6009M

Question	Answers	Notes	Total
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