Name of the Student:_____
Max. Marks : 23 Marks **Time : 23 Minutes**

Mark Schemes

Q1.

(a) A = mitochondrion

Accept mitochondria/crista(e).

B = presynaptic membrane/neurone

Accept synaptic knob/bulb or motor neurone.
Accept nerve cell for neurone.

C = (synaptic) vesicle(s)

D = synaptic gap/cleft;;

*4 correct = **2 marks***
*2–3 correct = **1 mark***
*0–1 correct = **0 marks***

2

(b) 1. Acetylcholine/neurotransmitter diffuses (across synaptic cleft);

2. (Acetylcholine/neurotransmitter) attaches to receptors on the sarcolemma;

Accept postsynaptic membrane for sarcolemma.
Accept abbreviations for acetylcholine as term is in the question.

3. Sodium ions enter leading to depolarisation/action potential;

Accept mark points in 'context of a postsynaptic neurone'.
Accept Na^+ for sodium ions.
'Sodium ion channels opening' on its own is not enough.

4. Calcium (ions) released by endoplasmic/sarcoplasmic reticulum;

Accept Ca^{2+} / Ca (ions not required as given in question).
Incorrect sequence, penalise one mark.

4

(c) 1. (Inside postsynaptic neurone/membrane/axon) is more negative

OR

Membrane/neurone/axon) potential is below resting potential

OR

Potential difference (across membrane) is greater;

Accept answers which refer to a numerical decrease in the resting

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potential.

Accept answers which refer to a 'decrease in the resting potential'.

Accept answers which refer to 'reduces/lowers potential' but not 'reduces potential difference'.

Accept p d for potential difference.

2. More sodium ions (required to enter) for depolarisation

OR

More sodium ions (required to enter) for action potential

OR

Prevents sodium ions causing depolarisation;

Accept to 'reach threshold' or 'generator potential' for 'action potential'.

Accept Na^+ for sodium ions.

2

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Q2.

(a) Correct answer of 5 / 5.4 / 5.44 × 10^{-2} = **2 marks**;;

Incorrect answer but shows 5 / 54 / 544 (ignore position of any decimal point or preceding/subsequent zeros) = **1 mark**;

*10^{-2} is essential for **two marks**.*

2

(b) H-zone decreases, I-band decreases, A-band no change;

1

(c) 1. Fast (fibres) <u>contract</u> quickly whereas slow (fibres) <u>contract</u> slowly

OR

Fast (fibres) used for short time whereas
slow(fibres) used for long time;

*Accept fast <u>contract</u> quick<u>er</u> **OR** slow contract slow<u>er</u> **OR** fast used for short<u>er</u> time **OR** slow used for long<u>er</u> time.*

Accept examples of short-time / power exercise e.g., sprinting, weightlifting and long-time exercise e.g., marathon, endurance.

2. Fast (fibres mainly) use anaerobic respiration

OR

Slow (fibres) use aerobic respiration;

3. Fast (fibres) produce ATP quickly

OR

Slow (fibres) produce ATP slowly

OR

Less ATP/energy (per glucose) from anaerobic respiration

OR

More ATP/energy (per glucose) from aerobic respiration;

Accept 'release energy' for 'produce ATP' in first and second statements.

Reject 'produce energy'.

Ignore number of ATP molecules produced but comparison must be correct.

4. Glycogen is a store of glucose

OR

Glycogen hydrolysed to glucose

OR

<u>Glycogenolysis;</u>

4

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Q3.

(a) 1. SAN releases (wave of) electrical activity;

Accept 'wave of excitation'.

2. (So) atria contract (at the same time);

Accept systole for 'contract'.

3. AVN relays/passes electrical activity after a (short) delay;

Accept 'impulse/s' or 'wave of depolarisation' for electrical activity but reject 'signal', 'message' ***once*** *only.*

Accept 'wave of excitation'.

4. (Via) Purkyne tissue in/and bundle of His;

Accept 'Purkinje' for Purkyne or similar spelling.

5. (So) ventricles contract (at the same time from bottom upwards);

Accept systole for 'contract'.

Penalise ***one*** *mark for incorrect sequence.*

If only the cardiac cycle is described allow one mark max atria contract and then ventricles contract.

5

(b) 1. Significant with age, hyperthyroidism, and high blood pressure

OR

High risk (of AF) with age, hyperthyroidism and high blood pressure;

Reject '<u>results</u> are significant' / '<u>results</u> not significant' ***once*** *only.*

Accept 'significant difference' or 'no significant difference'.

Accept 'not due to chance' for 'significant'.

Accept descriptions of 'high and highest (risk) e.g. 'more likely' and 'most likely'.

2. Most significant with high blood pressure

OR

Highest risk (of AF) with high blood pressure

OR

Least significant with hyperthyroidism;

Reject '<u>results</u> are significant' / '<u>results</u> not significant' ***once*** *only.*

Accept 'significant difference' or 'no significant difference'.

Accept 'not due to chance' for 'significant'.

Accept descriptions of 'high and highest (risk) e.g. 'more likely' and 'most likely'.

3. Not significant with high LDL

OR

High LDL is **not** a (AF) risk factor;

Reject '<u>results</u> are significant' / '<u>results</u> not significant' ***once*** *only.*

Accept 'significant difference' or 'no significant difference'.

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Accept 'due to chance' for 'not significant'.

4. (With) age, high blood pressure and hyperthyroidism reject the null hypothesis

OR

(With) high LDL accept the null hypothesis;

3 max

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