Mark schemes

Q1.

(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'.

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

[8]

Q2.

(a) 1. Increasing IAA concentration increases (cell wall) plasticity

OR

IAA activates enzymes which increases (cell wall) plasticity;

2. Increase in (cell wall) plasticity results in cell elongation;

*Accept 'stretching' for plasticity, Reject 'elasticity' **once** only.*

Idea of cell elongation or increase in cell length must be conveyed.

IAA causing cell elongation on its own is not enough.

2

(b) Correct answer of 570 (%) = **2 marks**;;

(**However**, if working shows plasticity values used, e.g. 8 and 1.2 (or difference of 6.8) **and** answer of 570 (%) = **1 mark**)

Answer or working shows 560 / 566 / 567 (%) **= 1 mark**

(**However**, if working shows plasticity values used, e.g. 8 and 1.2 (or difference of 6.8) **and** answer of 560 / 566 / 567 (%) = **0 marks**)

Answer of 120 (%) = **1 mark**

OR

Answer of 230 (%) = **1 mark**

OR

Answer of 340 (%) = **1 mark**

OR

Answer of 780 (%) = **1 mark**

OR

Answer of 1200 (%) = **1 mark;**

Accept 566 recurring for one mark.

Ignore any numbers after 560 or 566 or 567.

2

(c) 1 part/cm^3 of 10^{-1}/stock/GA and/to 9 parts/cm^3 of (distilled) water, then 1 part/cm^3 (of 10^{-2}) and/to 9 parts/cm^3 of (distilled) water

OR

0.1 parts/cm^3 of 10^{-1}/stock/GA and/to 9.9 parts/cm^3 of (distilled) water;

Accept any volumes equivalent in parts to example provided.

Accept '1 part/cm^3 of 10^{-1}/stock/GA and/to 9 parts/cm^3 of (distilled) water, then repeat'.

1

(d) **Max 3 marks from mark points 3 to 8**.

1. (Use distilled) water (control) **and** different (GA) concentrations **and** 10 (stem) segments in each;

   Accept use of specified number of segments in each dish with repeats, if total used = 60.

2. Measure (length of) stem/segments at start **and** at end (of investigation)

   OR

   Determine increase/change in length

   OR

   Determine percentage change in length;

   Accept 'cut to same length' = measure at start.

   Accept 'growth in length' as 'increase/change in length'.

3. (Place stems in same) volume of solution/GA;

4. (Leave for same period of) time;

   Accept any 'named period of time'.

5. (Same) temperature;

6. (Same) species/type (of plant);

   Accept 'same plant'.

7. (Same) age (of plant);

   Accept (stems) at same stage of growth/development.

8. (Same) diameter/thickness of stem/segments;

   Ignore pH, carbon dioxide, humidity, nutrients, and light.

5 max

[10]

Q3.

(a) 1. (There are) stretch-mediated sodium ion channels (in the membrane);

1, 2, 3, 4 Accept Na^+

***Max 2** if only reference to sodium and not sodium ions*

2. (Increased pressure) deforms/changes (sensory neurone/axon) membrane/lamella(e)

OR

(Increased pressure) deforms/changes sodium ion channels;

3. Sodium ion channels open;

4. Sodium ions diffuse in;

Accept sodium ions move in down a concentration gradient

5. Depolarisation (leading to generator potential);

Accept inside becomes positive

3 max

(b) 1. An action potential is only generated/produced when threshold is reached
OR

An action potential is **not** generated/produced until/unless threshold is reached;

Ignore any numbers linked to threshold

1 and 2 Accept impulse for action potential

2. When high pressure was applied (to the fingertip), threshold was reached
OR

High pressure is (an) above threshold (stimulus)
OR

High pressure generates an action potential;

Accept references to 'the first peak' for high pressure

Accept the converse for low pressure

2

(c) (The) refractory (period);

Ignore any reference to absolute or relative

Reject refraction period

1

[6]