Mark schemes

Q1.

(a) Valve **A**

(Left) atrioventricular

Chamber **B**

Left ventricle;

Reject right side in either context
*Accept mitral/bicuspid for Valve **A**.*
*Reject tricuspid for Valve **A***
*Ignore AV for Valve **A***

1

(b) Accept any **two** suitable safety precautions for 1 mark, eg;

Use a sharp scalpel/scissors

Wash hands/wear gloves

Disinfect bench/equipment

Cover any cuts

Cut away from self/others/on a hard surface

Safe disposal

Ignore take care with scalpel/scissors or keep away from fingers
Ignore goggles

1 max

(c) 1. Pressure in (left) atrium is higher than in ventricle/**B causing** valve to open;
OR
(When) pressure above valve is higher than below valve it opens;

Ignore pressure in front of/behind valve
As long as direction of opening/closing of valve is correct, ignore 'semi lunar'

2. Pressure in (left) ventricle/**B** is higher than in atrium **causing** valve to close;
OR
(When) pressure in below valve is higher than above valve it closes;

Accept cords/tendons prevent valve turning inside out
Ignore pressure in front of/behind valve
As long as direction of opening/closing of valve is correct,

ignore 'semi lunar'

2

(d) 1. More impulses/action potentials along sympathetic (nervous system pathway/branch);

Ignore signals/information/ messages

Idea of more impulses/action potentials is required

2. To SAN increasing the heart rate (seen in **Figure 2**);

2

(e) 73

(this is the *best* answer since all numbers quoted in the question are to 2 s.f.)

(73.4375)

Accept 73.4 / any correct rounding

1

(f) **Group to be given**

1. Sugar solution (only)
OR
A drink with sugar (**and** no caffeine);

Accept 'glucose' for sugar

Ignore named drinks unless qualified

Ignore 'sugar' by itself

Ignore references to use of a placebo tablet

Reason

2. To show/prove that sugar (alone) is not causing the increases (in HR)
OR
To show that sugar does not have an effect;

Accept 'to see the effect of sugar'

2

[9]

Q2.

(a) 1. Chemoreceptors detect rise in CO_2 / H_+ / acidity / carbonic acid / fall in pH
OR
Baro / pressure receptors detect rise in blood pressure;
2. Send impulses to cardiac centre / medulla;
3. More impulses to SAN;
4. By sympathetic (nervous system for chemoreceptors / CO_2)
OR
By parasympathetic (nervous system for baro / pressure receptors / blood pressure);

1. Ignore: location of receptors.

1. Ignore: chemoreceptors detect oxygen.

2 and 3. Accept: action potentials.

2. Reject: 'messages', 'signals', 'an impulse' or an 'action potential'.

3. Ignore: messages', 'signals', 'an impulse' or an 'action potential' as emphasis here is on increase in frequency.

4

Q3.

(a) 21.59 / 21.6;

19/88 × 100 = 1 mark

Accept for 1 mark - 19/69 × 100 = 27.5%;

(only award if rounding correct)

Max 1 for incorrect rounding

Accept any number of significant figures as long as the rounding is correct

2

(b) 1. Electrical activity only through Bundle of His / AVN;

2. Wave of electrical activity passes over / through both ventricles at the same time;

For 'electrical activity' accept impulses / depolarisation / action potential

Reject messages/signals/information once only

2. Accept 'wave of electrical activity passes through the Purkinje / Purkyne fibres / tissue'

2

[4]

Q4.

(a) 1. (Refers to) saltatory conduction
OR
(Nerve) impulses/depolarisation/ions pass to other neurones
OR
Depolarisation occurs along whole length (of axon);

Accept suitable description that refers to (transmission) from node to node (of Ranvier).

Accept action potential for depolarisation.

1 and 2. Accept action potentials for impulses.

1, 2 and 3. Reject first mark awarded if answer refers to messages/signals for impulses. Reject even if impulse/s also referred to.

2. (Nerve) impulses slowed/stopped;

3. (Refers to) <u>neuromuscular</u> junction
OR
(Refers to) <u>sarcolemma</u>;

3

(b) 1. Slower/fewer impulse(s) along sympathetic/parasympathetic (pathway/neurones);

Accept action potentials for impulses.

Reject no impulses.

1, 2 and 3. Ignore 'information' but reject first mark awarded if answer refers to messages/signals for impulses. Reject even if impulse/s also referred to.

2. (Impulses) from cardiac centre
OR
(Impulses) from medulla;

3. To SAN;

3