Q1



*ticks or crosses on the RHS*

**[5]**

**M2.**          **B**

**1**

**C**

**1**

**A**

**1**

**[3]**

**M3.**(a)     (i)


*one mark for each line*

*extra line negates a mark*

**3**

(ii)     any **one** from:

•        carbon dioxide / CO2

•        urea

*do* ***not*** *allow urine*

*ignore water*

*ignore ions*

**1**

(b)     (i)      B

**1**

(ii)     D

**1**

(iii)    vein

*accept correct named*

*examples*

**1**

(c)     (i)      any **one** from:

•        keeps artery / blood vessel open **or** widens artery / blood vessel

•        allows (more) blood to heart / cardiac muscle

•        (allows) blood to flow more easily

•        allows (more) oxygen to heart / cardiac muscle

**1**

(ii)     any **two** from:

•        bleeding

*allow blood clots*

•        infection

•        damaging blood vessels

•        damaging the heart

•        risk from anaesthetic

**2**

**[10]**

**M4.**          (a)     falls

**1**

from 0.25

**1**

to 0.19
but by 0.06 gains two marks

*if neither figure given, accept steadily /
at constant rate for one mark
accept mass of oxygen inversely related
/ negative correlation to height above
sea level for 2 marks*

**1**

(b)     (i)      1.8

*accept correct readings from graph for (5 and 6.8) if subtraction incorrect for one mark*

*allow one mark for correct subtraction from incorrect readings*

**2**

(ii)     (blood can carry) more oxygen

**1**

**[6]**

﻿

**M5.**          (a)     (i)      A **or** C

*allow lower case*

**1**

(ii)     B **or** D

*allow lower case*

**1**

(b)     (i)      60

**1**

(ii)     4

**1**

(c)     red blood cells

**1**

**[5]**

**M6.**(a)     **A** artery

*allow aorta*

**1**

**B** ventricle

*ignore references to left and right*

**1**

**C** atrium

*ignore references to left and right*

*allow atria*

**1**

**D** vein

*allow vena cava*

**1**

(b)     (i)      stent

**1**

(ii)     keeps (artery) open

**1**

so (more) blood can flow through

*allow blood can flow (more) easily*

*ignore ref to blood clots*

**1**

**[7]**

**M7.**(a)     any **two** from:

•        carbon dioxide / CO2

•        urea

•        protein

•        water / H2O

•        hormones / insulin.

*ignore food / waste / alcohol / drugs / enzymes*

*ignore glucose and oxygen*

*allow* ***two*** *correct hormones for 2 marks*

*allow* ***two*** *correct food components for 2 marks*

*allow antibodies*

*allow antitoxins*

**2**

(b)     (i)      plasma

**1**

platelets

**1**

(ii)     (cardiac) muscle

*allow muscular*

**1**

(c)     Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information in the Marking Guidance and apply a ‘best-fit’ approach to the marking.

**0 marks**No relevant content

**Level 1 (1−2 marks)**There is a description of at least one advantage of the cow tissue valve

**or**

a description of at least one disadvantage of the cow tissue valve.

**Level 2 (3−4 marks)**There is a description of at least one advantage of the cow tissue valve

**and**

at least one disadvantage of the cow tissue valve.

**Level 3 (5−6 marks)**There is a description of the advantages and disadvantages of the cow tissue valve

**or**

a description of several advantages of the cow tissue valve and at least one disadvantage.

**Examples of the points made in the response**

**Advantages of cow tissue valve:**

•        abundant supply of cows

•        so shorter waiting time

*ignore can take many years to find a suitable human donor*

•        no need for tissue typing

•        quicker operation

•        less invasive **or** shorter recovery time

•        cheaper operation costs

•        less operation / anaesthetic risks.

**Disadvantages of cow tissue valve:**

•        made from cow so possible objections on religious grounds

*ignore ethical arguments*

•        new procedure so could be unknown risks

*allow possible transfer of disease from cow*

•        risks of using a stent eg. blood clots, stent breaking or valve tearing

•        not proven as a long term treatment

•        may be rejected

*ignore information copied directly from the table without value added.*

**6**

**[11]**

**M8.**          (a)     (i)      count the pulse **or** count beats in artery in wrist neck **or** feel the pulse **or**take the pulse **or** find the pulse

*accept use of heart monitor* ***or*** *heart meter*

**1**

(ii)     80

*2 marks for correct answer*

*1f answer incorrect allow* ***1*** *mark for showing 8000 divided by 100* ***or*** *indicating cardiac output divided by stroke volume*

**2**

(iii)     Increased activity stroke volume
falls / gets less / should get higher / reach a peak

*accept does not increase* ***or*** *changes from 134 cm3**to 127 cm3*

**1**

(iv)    1ncreased / more ventricle contractions

*accept heart beat faster* ***or*** *it beats faster* ***or*** *more powerful contractions*

**1**

(b)     (stronger heart muscle) increases cardiac output **or** increases stroke volume

*accept pumps more blood (per beat)* ***or*** *pumps blood faster*

*ignore heart bigger*

**1**

          so more (oxygenated) blood can be sent to muscles

*accept more oxygen sent to muscles*

**1**

**[7]**

**M9.**          (a)     blood has red (blood) cells / haemoglobin

**1**

haemoglobin combines with / carries oxygen

*ignore ‘mix’*

***NB*** *Blood can form oxyhaemoglobin =* ***2*** *marks*

**1**

(b)     blood gains oxygen / becomes oxygenated (in the lungs)

*idea of acquiring oxygen must be unambiguous*

**1**

blood loses oxygen to the muscles / cells

**1**

because muscles are respiring (aerobically)

**1**

to provide energy (for exercise)

**1**

**[6]**

**M10.**(a)     (i)      muscular

**1**

(ii)     **7**

**1**

(iii)    an electrical device

**1**

(b)     (i)      in sequence:

**5**

**1**

**7**

**1**

**2**

**1**

(ii)     **3**

**1**

(c)     (i)      prevent backflow (of blood) / allow flow in only one direction / in the correct direction

**1**

(ii)     **A**

*no mark, but max* ***2*** *marks if incorrect*

**2** / atrium contracts / pressure in **2** increases

**1**

blood pushes ball (down / towards ventricle / towards **5** )

*allow this point even if valve in wrong part of heart*

**1**

(opens valve which) allows blood into **5** / ventricle

***or*** *converse points re closing the valve*

**1**

(d)     (i)      involvement of platelets / eg platelets ‘trigger’ clotting process / release enzyme(s) / release ‘clotting factors’

**1**

fibrinogen to fibrin
**or**meshwork formed (which traps blood cells)

**1**

(ii)     any **four** from:

*to gain* ***4*** *marks candidates should include at least:*

***one*** *advantage and* ***one*** *disadvantage*

**Advantages**

(improved circulation / O2 supply) provides:

•        more cell respiration

•        more energy released

•        (more) active life / not so tired / more physical activity

**Disadvantages**

•        danger of surgery / operation

•        infection from surgery / operation

•        valve may need replacing

•        clots may form and block blood vessels

*may need to take anti-coagulants – eg warfarin*

•        clots may cause heart attacks / strokes

**4**

**[17]**

**M11.**(a)     A - atrium

*ignore references to right / left*

**1**

B - ventricle

**1**

(b)     (i)      muscular

**1**

(ii)     push blood

*accept pump / force*

**1**

(c)
 

*arrows approx as indicated*

**1**

arrow(s) showing flow from A to B
from B out / up / to artery

**1**

(d)     (i)       male

**1**

65 and over

**1**

(ii)     fatty deposits / material in (coronary) arteries

*allow correct points made about heart attacks*

**1**

narrows / blocks / reduces flow

**1**

decreases oxygen supply (to heart muscle)

**1**

**[11]**

**M12.**(a)     (i)      50

**1**

(ii)     4

*accept 3.9 − 4.0*

**1**

(b)     (i)      glucose

**1**

oxygen

**1**

(ii)     to release more energy

**1**

(c)     correct readings from graph:

a = 120

b = 60

*allow 60 - 61*

**1**

calculation correct for candidate’s figures:

e.g. a − b = 60

**1**

level of fitness correct for candidate’s figures:

e.g. very fit

**1**

(d)     any **four** from:

•        higher heart rate (at 16 km / h) (so takes longer to slow to normal)

•        more energy needed

•        not enough O2 supplied / more O2 needed / reference to O2-debt

•        (more) anaerobic respiration

•        (more) lactic acid made / to be broken down / to remove / to oxidise

•        higher blood flow needed to deliver (the required amount of) oxygen.

*‘more’ must be given at least once for full marks*

*do not allow more energy produced*

*allow higher blood flow to remove lactic acid / remove (additional) CO2*

**4**

**[12]**

**M13.**          (a)     hold cells together **or** prevent flow of cells **or** trap cells

**1**

(b)     12500

*if correct answer, ignore working / lack of working*

* for* ***1*** *mark*

*ignore any units*

**2**

(c)     (i)      size RBC approximately same size capillary **or**no room for more than one cell **or**only one can fit **or**RBC is too big

*allow use of numbers*

*do* ***not*** *accept capillaries are narrow*

**1**

(ii)     more oxygen released (to tissues) **or**more oxygen taken up (from lungs)

**1**

         and any **two** from:

•        slows flow **or** more time available

•        shorter distance (for exchange) **or** close to cells / capillary wall

•        more surface area exposed

**2**

**[7]**

**M14.**(a)     5624

***allow 2 marks*** *for:*

*•        correct HR = 148* ***and*** *correct SV = 38 plus wrong answer / no answer*

***or***

*•        only one value correct* ***and*** *ecf for answer*

***allow 1 mark*** *for:*

*•        incorrect values* ***and*** *ecf for answer*

***or***

*•        only one value correct*

**3**

(b)     (i)      **Person 2** has low(er) stroke volume / SV / described

*eg* ***Person 2*** *pumps out smaller volume each beat*

*do* ***not*** *allow* ***Person 2*** *has lower heart rate*

**1**

(ii)     **Person 1** sends more blood (to muscles / body / lungs)

**1**

(which) supplies (more) oxygen

**1**

(and) supplies (more) glucose

**1**

(faster rate of) respiration **or** transfers (more) energy for use

*ignore aerobic / anaerobic*

*allow (more) energy release*

*allow aerobic respiration transfers / releases more energy (than anaerobic)*

*do* ***not*** *allow makes (more) energy*

**1**

removes (more) CO2 / lactic acid / heat

*allow less oxygen debt*

**or** less lactic acid made
**or** (more) muscle contraction / less muscle fatigue

*if no other mark awarded,*

*allow person 1 is fitter (than person 2) for max 1 mark*

**1**

**[9]**