

Mark schemes

1

- (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]

2

- (a) (i) 150 1
- (ii) any **two** from:
accept correct use of numbers
accept pulse rate
- lower resting rate
 - lower rate during exercise
 - recovers faster after exercise
- allow a general statement about lower rate if neither of the first two points given* 2
- (b) glucose 1
- oxygen 1

[5]

3

(a) B = rib

1

C = diaphragm

1

(b) (i) D

allow lower case

1

(ii) carbon dioxide

1

[4]

4

(a) A

*no mark – can be specified in reason part
if B given = no marks throughout
if unspecified plus two good reasons = 1 mark*

high(er) pressure in A

*allow opposite for B
do not accept 'zero pressure' for B*

1

pulse / described in A

*accept fluctuates / 'changes'
allow reference to beats / beating
ignore reference to artery pumping*

1

(b) (i) 17

1

(ii) 68

accept correct answer from candidate's (b)(i) × 4

1

(c) (i) oxygen / oxygenated blood
allow adrenaline
ignore air 1

glucose / sugar
extra wrong answer cancels eg
sucrose / starch / glycogen / glucagons / water
allow fructose as an alternative to glucose
ignore energy
ignore food 1

(ii) carbon dioxide / CO₂ / lactic acid
allow CO₂ / CO²
ignore water 1

[7]

5

(a) (i) 120 1

(ii) 11 760 **or**
correct answer from candidate's answer to (a)(i)
correct answer with or without working
if answer incorrect
120 x 98 or
candidate's answer to (a)(i) x corresponding SV gains 1 mark
if candidate uses dotted line / might have used dotted line(bod) in
*(a)(i) **and** (a)(ii) no marks for (a)(i) but allow full ecf in (a)(ii) eg 140*
x 88 = 12320 gains 2 marks 2

(b) trained athlete has higher stroke volume / more blood per beat 1

same volume blood expelled with fewer beats

or for same heart rate more blood is expelled 1

(c) increased aerobic respiration

or

decreased anaerobic respiration

allow correct equation for aerobic respiration

accept don't have to respire anaerobically

1

increased energy supply / need

1

less lactic acid formed

or to breakdown lactic acid **or** less O₂-debt

1

can do more work **or** can work harder / faster / longer

accept muscle contraction for work

or less fatigue / cramp / pain

1

[9]

6

(a) (i) B **or** D

1

(ii) A **or** B

1

(b) any **four** from:

more / faster must be implied at least once for full marks

- increased blood (flow)
ignore reference to breathing
- (more) oxygen supplied **or** aerobic respiration
*allow less anaerobic (respiration) **or** and prevents oxygen debt*
- (more) glucose / sugar / food supplied
ignore feeding
- (higher rate of) respiration
- (more) energy needed / released
allow made
- (more) carbon dioxide removed
- (muscles) doing (more) work **or** muscles contracting
- remove heat / cooling
- remove lactic acid **or** less lactic acid formed

4

[6]

7

(a) (i) 6 peaks in heart rate

*accept 6 increases / spikes **or** goes very high 6 times*

allow heart rate increases each time he runs

1

(ii) 2.5 / 2½

allow 2 minutes 30 seconds

*do **not** accept 2.3 / 2:3 / 2.30*

1

(b) *more / faster / a lot **must** be stated at least once for full marks*

(more) oxygen supplied / needed

allow less anaerobic (respiration)

or (more) aerobic respiration

***or** prevents oxygen debt*

1

(more) glucose / sugar / food supplied / needed

ignore feeding

1

(more) energy needed / released
allow energy produced / made

1

(more) carbon dioxide / heat / lactic acid removed (from muscles) **or** more cooling
or less lactic acid formed

1

[6]

8

insufficient / no oxygen available

1

for (just) aerobic respiration

or

respires anaerobically

1

[2]

9

(a) (i) glycogen

1

(ii) respiration

1

(b) (i) 483 kJ

1

(ii) oxygen

1

(iii) dilate

1

(c) supplies more / a lot of oxygen **or** removes more carbon dioxide
or release more energy / faster respiration

1

[6]