

(The circulatory system (heart, blood vessels, blood))

Q1.(2018)

any **two** from:

- carbon dioxide
- water
- glucose
- amino acids
- lactic acid

Q2.(2018)

more haemoglobin

(therefore) more oxygen can be
carried / transported

(for) more (aerobic) respiration
of muscle (cells)

or

more energy released for
muscle (cells)

Q3.(2018)

pulmonary artery

vena cava

Q4.a)(2018)

B

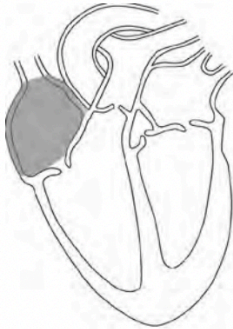
Q4.b)(2018)

any **three** from:

- arteries have a **thicker** layer of muscle (tissue) **or** veins have a **thinner** layer of muscle (tissue)
- arteries have a **thicker** layer of elastic tissue **or** veins have a **thinner** layer of elastic tissue
- arteries have a **narrower** lumen **or** veins have a **wider** lumen
- arteries do not have valves **and** veins have valves

Q5.(2018)

allow an X drawn anywhere in
grey shaded area below:



Q6.(2018)

an irregular heart beat

Q7.(2019)

- backflow can occur **or** some blood flows backwards
- less blood leaves the heart **or** less blood is pumped around the body **or** some blood stays in the heart (instead of being pumped out) **or** reduced blood pressure **or** reduced flow rate
- less oxygen supplied to muscles / cells
- (so) less aerobic respiration
- (so) less energy released
- (so) less (efficient) muscle contraction
- anaerobic respiration takes place
- less (efficient) removal of lactic acid **or** lactic acid builds up **or** oxygen debt occurs
- (lactic acid building up) causes muscle fatigue
- less (efficient) removal of carbon dioxide (from blood)

a **level 2** response should refer to both respiration **and** the effects on exercise

Q8.a)(2019)

(deaths mechanical valve =)
6% / 6.31136%

(deaths biological valve =)
10% / 10.14823%

(therefore a) higher proportion /
percentage of patients die with
biological valve

or
patients are more likely to die
with biological valve

Q8.b)(2019)

platelets

Q8.c)(2019)

mechanical valves

- longer lasting **or** more durable **or** don't wear out as easily **or** less likely to need replacing (within 6 years)
- blood clots (on the brain) are more likely (after surgery)
- patient has to take anti-clotting medication (for the rest of their lives)
- if medication not taken (correctly), clots can lead to blood clots on brain / heart attack
- medication can lead to excessive bleeding (after injury)
- some patients say they can hear the valves opening and closing
- survival rate at 5 years is slightly higher for mechanical valve
- lower percentage of deaths due to heart-related problems

biological valves

- no additional medication required
- ethical issues surrounding use of animal tissue
- valve may harden
- more likely to need further operation **or** another new valve
- more likely to be rejected
- more likely to need (immuno-suppressant) medication

both valves

- both are readily available
- little wait time

a **level 2** response should contain comparisons of both valves **and** some reference to own knowledge

Q9.a)(2019)

plasma

Q9.b)(2019)

Benedict's (reagent / solution)

Q9.c)(2019)

add chemical / Benedict's
(reagent to urine)
and
boil / heat

positive result – (colour changes
from blue to brick) red

Q9.d)(2019)

Organisation

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the blood is more concentrated
or less dilute (than the solution
in the cells)

(so) water moves out of cells by
osmosis

water moves through a partially
permeable membrane

Q9.e)(2019)

projections / folds / villi provide a
large surface area

walls of projections / folds / villi /
capillaries are thin / one cell
thick for shorter absorption /
diffusion distance

(small intestine is) very long,
increasing time (for absorption)

good / efficient blood supply to
maintain concentration gradient

cells have many mitochondria
for (aerobic) respiration for
active transport

or
cells have many mitochondria
for energy release for active
transport

Q10.a)(2019)

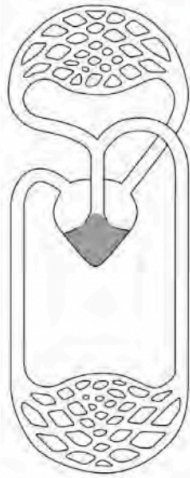
blood is pumped to the lungs by
one / right side of the heart

and

blood is pumped to the body by
the other / left side of the heart

Q10.b)(2019)

ventricle correctly identified as
any part of grey area below:



Q10.c)(2019)

oxygenated and deoxygenated
blood mixes

(so) less oxygen reaches the
body / tissues / cells

Q10.d)(2019)

concentration gradient (of
oxygen) is shallow(er) / less
steep

(therefore) less oxygen diffuses
into blood / cells / gills

(so) less (aerobic) respiration
occurs so less energy is
released / available

or

(so more) anaerobic respiration
occurs so less energy is
released / available

(so) less metabolism

or

(so when) anaerobic respiration
occurs, lactic acid is produced
(and is toxic)

Q10.e)(2019)

stem (cells)

Q10.f)(2019)

any **one** from:

- paralysis
- diabetes

Q10.g)(2019)

any **one** from:

- easy to breed
- easy / cheap to keep / rear
(as are small)
- don't take up much space

Q10.h)(2019)

any **one** from:

- it's not a mammal **or** it is an amphibian
- regeneration in gills may be different to that in other organs
- metabolism / body processes are too different to humans

Q11.a)(2021)

anti-B antibodies in patient /
receiver / recipient
will bind to type B antigens on
person's / donor's red blood
cells

(so) red blood cells clump
together and are wider than
capillaries

or

(so) red blood cells clump
together and block capillaries

(so) cells have reduced supply
of oxygen / glucose

or

(so) cells can't respire

Q11.b)(2021)

no antigens (on type O red blood cells)

(so) antibodies cannot bind (to the antigens / red blood cells)

Q11.c)(2021)

hepatitis C infection

Q11.d)(2021)

no / less bile reaches the small intestine

(so) less / no emulsification of fat

(so) smaller surface area for lipase to break down fat

pH of small intestine is not neutralised / alkaline

(so) lipase is not at its optimum pH to break down fat

Q12.a)(2023)

A

Q12.b)(2023)

C

Q12.c)(2023)

right atrium

Q13.(2023)

any **two** from:

- (artery) has a **thicker** muscle (tissue)
- (artery) has a **thicker** elastic (tissue)
- (artery) has a **narrower** lumen
- (artery) does not contain valves

Q14.a)(2023)

as the percentage of the
(coronary) artery that is blocked
increases, blood flow decreases

Q14.b)(2023)

scale on y-axis

all points plotted

correct curved line of best fit

Q14.c)(2023)

correct answer from student's
line in **Figure 3**

Q15.(2023)

- reduced blood flow to heart (muscle / tissue / cells)
- (so) less oxygen to heart (muscle / tissue / cells)
- (so) less glucose to heart (muscle / tissue / cells)
- (so) less (aerobic) respiration (in heart / body cells)
- (more) anaerobic respiration
- (so) less energy (released)
- (so) less muscle contraction
- (so) less blood / oxygen / glucose around the body (from heart)
or slower flow of blood / oxygen / glucose to body (from heart)
- less carbon dioxide removed from body (muscle / tissue / cells)
- (resulting in) breathlessness
- (resulting in) tiredness
- (anaerobic respiration causes) production of lactic acid
- (build-up of lactic acid) causes muscle fatigue / pain or chest pain

For **Level 3**, students must explain the effect of reduced oxygen / glucose on respiration or energy release and its consequence

Q16.(2023)

Organisation

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any **one** pair from:

- (insert) stent(s)
(to) open (coronary) artery
- (prescribe) statins (1)
(to) reduce (blood)
cholesterol (1)
- heart (and lung) transplant (1)
(to) replace the diseased
heart with a healthy heart (1)
- use an artificial heart (1)
(to) keep the patient alive
while waiting for a transplant
(1)
- (artery / heart) bypass (1)
(to) divert blood around the
blockage (1)

Q17.a)(2024)

pushes / moves blood

to get oxygen around the body

Q17.b)(2024)

provides oxygen (for respiration)

Q17.c)(2024)

statin(s)

Q17.d)(2024)

(stent) opens / widens (blocked
blood) vessel

to allow (more) blood to flow
or
to allow (more) glucose / oxygen
to the heart (cells / tissue /
muscle)