



EXAM PAPERS PRACTICE

Boost your performance and confidence with these topic-based exam questions

Practice questions created by actual examiners and assessment experts

Detailed mark scheme

Suitable for all boards

Designed to test your ability and thoroughly prepare you

Level: IGCSE Oxford AQA Biology (9201)

Subject: Biology

Topic: IGCSE AQA Biology

Type: Mark Schemes

2002



1583

To be used by all students preparing for IGCSE Oxford AQA Biology (9201)
Students of other Boards may also find this useful

Biology

IGCSE AQA

Key skills



Mark schemes

1.

- (a) less blood flows through **or** less blood flows to the heart (muscle / cells / tissue)

1

less oxygen (reaches the heart muscle)

allow less respiration

allow less energy released

*do **not** accept less energy produced / made / created*

1

- (b) D

1

- (c) B

1

- (d) is more likely to get a blockage (with high cholesterol)

or

blockage could be biggest

ignore has the highest blood cholesterol concentration

1

- (e) 4 **and** 5.6

1

$$\left(\frac{5.6}{4}\right) = 1.4$$

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allow correct division using

either 5.3 or 5.8 (for person D)

1



- (f) opens / widens (artery)
allow pushes blockage to the side 1
- so (more) blood can flow through
allow (more) oxygen(ated blood) can flow through 1
- (g) platelets 1
- (h) **Level 2:** A judgement, strongly linked and logically supported by a sufficient range of correct reasons, is given. 3–4
- Level 1:** Relevant points are made. They are not logically linked. 1–2
- No relevant content** 0

Indicative content:

Advantages:

- **only** have to take the tablet once a day
- **only** a tablet so easy to take **or only** a tablet so not painful to take
- (drugs are effective so) less likely to get a blood clot
- drugs are cheap so less cost to NHS **or** drugs are cheap so (more) people can afford them
- drugs have been used for a long time so must be safe / trusted



Disadvantages:

- patients have to make sure they always have a supply of drugs
- patients could forget to take the drugs (every day)
- patients could still get a blood clot in the first week
- restrictions on lifestyle because patients have to have a blood test every few weeks
- restrictions on lifestyle because patient can't eat certain foods
- patients may get a blood clot if they eat the wrong food
- risks associated with puncturing skin / infection
- patient may have a fear of needles
- higher risk of bleeding / bruising

For **Level 2** students must evaluate, including consideration of, the advantage and disadvantage of anti-clotting drugs.

[14]

2.

- (a) circulatory / circulation (system)
allow cardiovascular (system)
ignore blood (system)
ignore cardiorespiratory system

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- (b) any valve ringed



allow more than one valve separately ringed

1



- (c) prevent backflow (of blood)
allow correct description of backflow
or
ensure one-way flow
allow maintains (correct) direction of blood

1

- (d) vein
allow correctly named veins

1

- (e) any **two** from:

(referring to mechanical valves)

- long lasting
or
durable
or
does not break / tear
or
does not wear out
allow reliable
allow less likely to need a replacement (after 5 years)
ignore no need for a replacement
- do not need to go into hospital / surgery again
- no ethical issues (surrounding use of living / animal tissue)
- no risk of rejection
- no need for anti-rejection / immunosuppressant drugs
- no risk of transmission of disease

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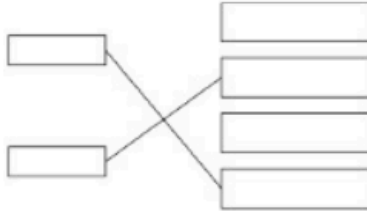
- (f) no need to take anti-clotting medication
allow can't hear a pig valve
allow can get a better fit with a pig valve
allow less leaky with a pig valve
allow less likely to get a heart attack / stroke
ignore will not get blood clots (around the valve)

2

1



(g)



an additional line from a medical condition negates the mark

2

[9]

3.

(a) **Level 2:** Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.

3-4

Level 1: Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.

1-2

No relevant content

0

Indicative content:

- 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



(b)

ignore raw numbers from the table

(deaths mechanical valve =) 6% / 6.31136%
allow correctly rounded value

1

(deaths biological valve =) 10% / 10.14823%
allow correctly rounded value

1

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

patients are more likely to die with biological valve

do not accept more patients die with a biological valve

*allow 2 marks for ratio mechanical : biological = 1:1.6 or
1:1.7 or correctly calculated value*

*allow 3 marks for deaths with biological
valves = 4% / 3.83687% higher or correctly rounded
value*

or

*patients are 1.6 / 1.7 times more likely to die with
biological valves*

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*if no other marks awarded, allow for 1 mark
chance of death after a valve replacement is
8% / 7.77247% or correctly rounded value*

1

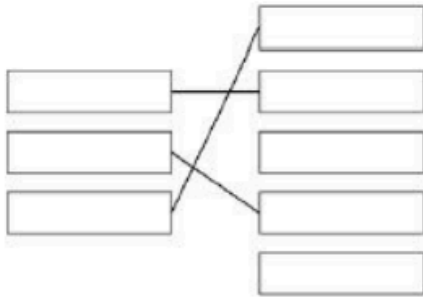


- (c) platelets
allow thrombocytes 1
- (d) **Level 3:** A judgement, strongly linked and logically supported by a sufficient range of correct reasons, is given. 5-6
- Level 2:** Some logically linked reasons are given. There may also be a simple judgement. 3-4
- Level 1:** Relevant points are made. They are not logically linked. 1-2
- No relevant content** 0
- Indicative content:**
- 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



4.

(a)



additional line from a blood component negates the mark for that component

1
1
1

(b) C

1

(c) (vessel) B

thick walls **or** thick muscle / elastic tissue
do not accept ref to 'cell walls'

1

or
lumen is small / narrow
allow description of 'lumen'

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1

(d) 95

1

(e) (because coronary) arteries / they are narrower

allow (because the coronary) arteries are blocked / clogged (with fat)

1

(f) $250 \times 60 (= 15\ 000)$

or
15 000

allow 0.25×60

1



15

allow $\frac{\text{answer to marking point 1}}{1000}$

an incorrect conversion to dm^3 in calculation does not negate marking point 1

1

an answer of 15 scores 2 marks

(g) any **two** from:

- no need to stay as long in hospital (after procedure) **or** can go home sooner / same day

allow only need to stay 2–3 hours in hospital (after procedure)

allow less scarring

allow less chance of infection

allow only a small cut needed

- not as / less invasive **or** no need for a major operation **or** no need for general anaesthetic
- shorter recovery time **or** can get back to normal lifestyle quicker **or** less time needed off work

allow only 7 days recovery

- lower risk of a heart attack (during procedure)

ignore reference to cost

ignore idea that it takes less time overall

2

(h) lower chance of failure (within one year)

allow only a 5% chance of failure

1

only need one operation to treat multiple blockages **or** can treat multiple blockages at one time

ignore ref to anaesthetic or CABG being a long-term treatment

1

[14]



5.

(a) any **two** from:

*allow proteins / hormones / antibodies / vitamins /
minerals / ions / fatty acids / glycerol*

- carbon dioxide
- water
- glucose
- amino acids

ignore sugar / enzymes / nutrients / waste

- lactic acid

2

(b) more haemoglobin

max 2 marks if 'more' is not given

(therefore) more oxygen can be carried / transported

1

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

1

or

more energy released for muscle (cells)

*allow less anaerobic respiration / lactic acid / oxygen
debt / fatigue in muscle (cells)*

i.e. addition of 'debt'

*do **not** accept energy produced*

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1

(c) pulmonary artery

1

vena cava

1

(d) B

1



(e) 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*

if neither marking points 1 or 2 awarded, allow arteries have a thick wall **and veins have a thin wall*

or

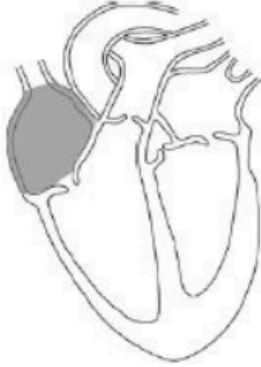
arteries have a thicker wall or veins have a thinner wall for 1 mark

*do **not** accept 'cell wall'*

- arteries have a **narrower** lumen **or** veins have a **wider** lumen
allow descriptions of 'lumen'
- arteries do not have valves **and** veins have valves
*allow **only** veins have valves*



(f) allow an X drawn anywhere in grey shaded area below:



if a large X is drawn, award the mark if the intersection touches the grey area
if a label line is used, award marks if the end of the label line touches the grey area
allow label 'pacemaker'
ignore label 'right atrium'

1

(g) an irregular heart beat

allow arrhythmia
allow fibrillation
ignore heart failure
do not accept cardiovascular disease / heart murmur

1



6.

(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** EXAM PAPERS PRACTICE

no mark, but max 2 marks if incorrect

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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

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4

[17]