thebiotutor

AS Biology OCR

Unit F211: Cells, Exchange & Transport

Module 2.1 Exchange Surfaces & Breathing

Answers

1. (i) *award both marks for correct answer*

$\frac{3.14}{0.52}$;

6:1; 2

(ii) ratio for sphere **B** is three times smaller; ora

allow ecf if wrong calculation in (a)(i) 1

(iii) *any two from the following:*

living cells need to take in oxygen/ nutrients and remove (metabolic) waste;
ref. passive processes / diffusion;
rate of diffusion too slow if SA:V ratio too small; max 2

[5]

2. diaphragm (contracts / flattens and) moves downwards;
intercostal muscles <u>contract</u> to move ribs, up / out;
increase <u>volume</u> of thorax;
reduce pressure inside thorax;
to below atmospheric pressure/creates pressure gradient / AW;

IGNORE *ref to internal / external*
ACCEPT *increase volume of lungs / chest*
ACCEPT *decrease pressure in lungs / chest*
must ensure the pressure gradient is in correct direction – lower in lungs

[4]

3. large / active, organisms have high(er), demand for oxygen / need to remove CO_2;
small(er), <u>surface area to volume ratio / SA:V / surface area:volume</u>;
surface area too small / distance too large / diffusion takes too long (to supply needs);

ACCEPT ORA *throughout*
IGNORE *ref to nutrients*

ACCEPT *diffusion too slow*
look for reason why diffusion not good enough

[2]

4. (i) goblet / mucus (secreting) cell;
ciliated (epithelium);

DO NOT ACCEPT *'globlet'*
DO NOT ACCEPT *'cilia cell' 'ciliate'*

2

(ii) (A / goblet cells) release mucus / AW;
(mucus) traps, dust / particles / named particle;
ciliated cell / B / cilia, wave / waft / move, mucus;
to, top of trachea / back of mouth / AW;

ACCEPT *release / creates / produces / secretes*
DO NOT ACCEPT *excrete*

ACCEPT *bacteria / microorganisms / pathogens*
IGNORE *dirt / germs*
DO NOT ACCEPT *'combines with'*
ACCEPT *'hair like projections'*
DO NOT ACCEPT *'hairs'*
Idea of up and out of lungs

3 max

(iii) to constrict the bronchus / AW;

example of AW e.g. reduce diameter of bronchus
DO NOT ACCEPT *'ref to increasing diameter' – (note: if 'increase and decrease diameter' is used do not allow mark as it is contradiction)*
ACCEPT *'airways'*
ACCEPT *'control flow of air'*

1

[6]

5. (i) nucleus / nuclear envelope / nuclear membrane; 1

(ii) (made up of) one type of / (squamous) epithelium**,** cell(s);
A *same* **R** *similar alone*
(group of) cells performing the same function(s); **A** *task / job* 1
max

(iii) large surface area;
permeable;
thin / short, diffusion path;
moist;
good blood supply / close to blood;
well ventilated / in contact with respiratory medium; 2
max

[4]

6. many, air spaces / alveoli;
large surface area; **R** ref to surface area to volume ratio
thin wall of, alveolus / capillary; **A** one cell thick **R** 'thin wall' on its own
good blood supply / large capillary network;
air passage / bronchiole;
capillary close proximity to alveolus;

R refs. to cilia, mucus, elasticity 3 max

[3]

7. *credit any five descriptions from the following:*
many alveoli to produce large surface area;
barrier, thin / only two cells thick;
good blood supply / many capillaries;
to carry dissolved gases to and from the alveoli;
ventilation / air movement to refresh the air in the alveoli;
(contains) elastic tissue to stretch and recoil to help expel air;

[5]

8. (a) (i) *First two points are marked independently*

diaphragm / **intercostal** muscles, contract:
DO NOT CREDIT *internal intercostal muscles contract*

diaphragm moves down / ribs move upwards and outwards;
DO NOT CREDIT *diaphragm flattens alone*
ACCEPT *movement of diaphragm pushes digestive organs down*

volume of **thorax** increased;
DO NOT ACCEPT *expands (for increased volume)*

pressure inside thorax falls;
DO NOT ACCEPT *size for volume*
ACCEPT *capacity for volume*
ACCEPT *lungs / chest (cavity), for thorax*

to below atmospheric pressure (so air enters lungs);
DO NOT CREDIT *pressure gradient alone - direction of gradient must be specified*

2 max *for mechanism*

QWC:

accept three technical terms used and spelt correctly;
*accept any **three** from: diaphragm, intercostal, volume,*

pressure, thorax, thoracic cavity

3 max

(ii) it falls / goes down / AW;

ACCEPT *decreases in volume / volume gets smaller*

DO NOT CREDIT *empties, closes, flattens, deflates, becomes smaller*

DO NOT ACCEPT *amount for volume*

1

(iii) soda lime / sodium hydroxide / potassium hydroxide / calcium hydroxide;

ACCEPT *correct formulae*

NaOH / KOH / $Ca(OH)_2$

DO NOT ACCEPT *calcium oxide*

ACCEPT *limewater, lime soda*

1

(b) to ensure all air breathed comes from chamber
OR
to prevent, escape of air / entry of air, through nose;

ACCEPT *air may be breathed in or out through nose*

ACCEPT *ensures breathes through mouth*

make results <u>invalid</u>;

DO NOT ACCEPT *ref accuracy, reliability, false results*

DO NOT ACCEPT *invalid* ***and*** *accuracy / reliability (use of both terms) anywhere in the answer*

2 max

(c) *Note question relates to measuring* ***vital capacity***

use (medical grade) oxygen / fresh air;

ACCEPT *ensure there is enough oxygen / air*

disinfect mouthpiece;

ACCEPT *change / wash mouthpiece*

ref. to health of subject;

e.g. asthmatics

ref to correct functioning of equipment;

e.g. maintain constant temperature (so that volume of gases is not affected)

ensure, valve / hinge, is working

level of water correct

1.2.1

no leaks / airtight / lips sealed around mouthpiece

2 max

[9]