M1. (a) glucose is absorbed by diffusion into the bloodstream

then blood delivers glucose to muscles in capillaries

(b) to stop air getting in

(c) yellow

d) collect the CO$_2$ / gas with a measuring cylinder / gas syringe

(volume collected) in a certain time using a timer / watch

(e) yeast produces ethanol but muscles produce lactic acid

*marks can be awarded from correct word or balanced symbol equations*

yeast produces CO$_2$ but muscles do not

*answers must be comparative*

both release small amounts of energy
ignore both occur without oxygen
M2. (a) (i) mitochondrion / mitochondria
    must be phonetically correct

(ii) carbon dioxide / CO₂
    water / H₂O
    in either order
    accept CO₂ but not CO³
    accept H₂O or HOH but not H₂O

(iii) diffusion
    high to low concentration
    allow down a concentration gradient
    through (cell) membrane or through cytoplasm
    do not accept cell wall

(b) ribosomes make proteins / enzymes
    using amino acids
    part A / mitochondria provide the energy for the process
    allow ATP
    do not accept produce or make energy
M3.(a) motor

allow efferent / postsynaptic
allow another relay (neurone)  

(b) release of chemical (from relay neurone)

allow ecf for ‘motor’ neurone from (a)
allow release of neurotransmitter / named example

chemical crosses gap / junction / synapse

allow diffuses across
allow chemical moves to X

chemical attaches to X / motor / next neurone (causing impulse)

(c) (curare) decrease / no contraction

accept (muscle) relaxes

(strychnine) increase / more contraction

if no other mark awarded allow 1 mark for (curare) decrease / no response and (strychnine) increase / more response
M4. (a) more concentrated

must be a comparison

than the cell / cytoplasm

accept more salty / solutes / ions

accept cell is less concentrated than solution for 2 marks

(b) (i) turgid

(ii) plasmolysed

accept flaccid

(c) any four from:

• water left the cells (in A)
• by osmosis
• from dilute to more concentrated solution

accept high to low water potential or from high to low water concentration

• via partially permeable membrane
• so cell membrane shrank away from cell wall

(d) water enters the cells (by osmosis)

allow 1 mark for:

they burst / lyse / lysis occurs

water leaves and cell shrinks (if they think it is hypertonic solution)

animal cells have no cell wall or plant cells have a cell wall

cell wall prevents lysis / bursting / allows turgidity

allow correct description
M5.

(a) (i) diaphragm

accept phonetic spelling

(ii) (because) the volume (inside the jar) increases

maximum two marks if no reference to correct part of model

(causing) the pressure to decrease

(and) air enters the balloon

allow oxygen

(b) (i) (so it moves by) diffusion

do not allow osmosis or active transport

from a high concentration (of oxygen) to a low concentration

allow down its / oxygen concentration gradient from the air

or to the blood

or

(because) there is a high(er) concentration (of oxygen) in the air or there is a low(er) concentration of oxygen in the blood

ignore reference to amount of oxygen

(ii) many gill filaments

must be in the correct pairs to gain 2 marks

(give a) large surface / area

do not allow surface area to volume ratio

or

thin

(or)

good blood supply

(or)

water continually flows over them / continually ventilated

(to) maintain the concentration gradient

[8]
M6.  

(a) \( \frac{0.15}{1.35} \times 100 \) 

11.1 \( \% \) 

allow 11.1 \( \% \) with no working shown for 2 marks

(b) to allow results to be compared 
or 
they had different masses at the start

(c) axis correct scale and labelled

5 points correctly plotted 
allow ecf from 05.1 
allow 1 mark for 4 points correctly plotted

line of best fit

(d) 0.5 

allow 0.45–0.55

(e) (0.0 to 0.4) water moves into cells

(0.6 to 0.8) water leaves cells
by osmosis

(f) any two from:
• concentration of solutions
• drying of chips
• accuracy of balance
• evaporation from tubes