Name of the Student:_____
Max. Marks : 27 Marks **Time : 27 Minutes**

Mark Schemes

Q1.

(a) any **one** from:

- (Type 2) diabetes

  ignore obesity

  *do **not** accept Type 1 diabetes allow cardiovascular disease ignore heart attack / failure*
- (coronary / ischaemic) heart disease / CHD
- high blood pressure
- cancer
- depression

  allow (osteo)arthritis

1

(b)

$27 = \frac{68.1}{\text{height}^2}$

1

$\text{height}^2 = 68.1 \div 27$

or

$\text{height}^2 = 2.522(\text{r}) / 2.52 / 2.5$

allow height = $\sqrt{\frac{68.1}{27}}$

or

allow height = $\sqrt{2.522(\text{r})}$

1

height = 1.59 (m) allow height =

allow a correctly rounded value

if 2.5 is given in step 2 allow an answer of 1.58 (m)

1

(c) overweight

*answer must be consistent with height calculated in **(b)***

1

(d) any **three** from:

*max **2** marks if refer to energy being made / used / produced / created*
allow reference to calories / joules for energy

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- increased energy intake if more food eaten

  allow increased energy intake if more fat / carbohydrate eaten
  allow converse
  allow energy taken in when you eat

- if exercise more, more energy is transferred / released

  allow if exercise more, respiration / metabolism increases ***or*** *is faster*
  allow converse
  allow energy is transferred during exercise
  do ***not*** *accept energy is burnt during exercise*

- if more energy is taken in than is transferred body mass increases
  or
  if less energy is taken in than is transferred body mass decreases

  allow if less energy is transferred than is taken in body mass increases
  or
  if more energy is transferred than is taken in body mass decreases

- if energy intake = energy transferred body mass stays the same

  if no marks are awarded allow ***1*** *mark for food eaten can increase body mass* ***and*** *exercise can decrease body mass*
  or
  allow ***1*** *mark for if a lot of food is eaten* ***and*** *little exercise is done body mass increases*
  allow converse

3

(e) **Level 3:** Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.

5–6

Level 2: Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.

3–4

Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.

1–2

No relevant content

0

Indicative content
During exercise:

- increased breathing rate
- increased breath volume
- (to) take in more oxygen for (aerobic) respiration
- (and) exhale more carbon dioxide
- increased heart rate
- (so) increased blood flow (to muscles)
- (to) transport oxygen / glucose to respiring cells faster
- (and) increase rate of carbon dioxide removal
- glycogen converted to glucose

- insufficient oxygen supplied (during prolonged vigorous exercise)

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- (so) lactic acid is formed (during anaerobic respiration)
- (and) an oxygen debt is created
- (lactic acid causes) muscles become fatigued / tired **or** (causes) muscles to stop contracting efficiently
- allow reference to sweating **or** increased body temperature **or** vasodilation (during or after exercise)

After exercise:
- heart rate remains high **or** heart rate slowly decreases
- continue to breathe rapidly **or** breathing rate slowly decreases
- (to) pay back oxygen debt
- oxygen debt is the amount of oxygen needed to break down lactic acid
- (and to) provide more oxygen to react with the lactic acid and remove it from cells
- (some) lactic acid transported to liver
- (lactic acid) is converted back into glucose

For Level 3 need reference to:
- changes during **and** after exercise
- lactic acid **and** its removal.

[14]

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Q2.

(a) opened and closed the tap (so water enters from reservoir)

allow opened the tap (carefully / gently)

1

(b) air bubble moves further (in a given time)

allow air bubble moves faster

1

(so) resolution is improved

allow it is easier to see a small change (in volume)
ignore is easier to measure unqualified
allow measurements are more accurate
ignore to make test more accurate
ignore references to precision or validity

1

(c)

*an answer of 10.56 (mm^3/min) scores **3** marks*

$\frac{66}{5}$

or

13.2 (mm/min)

*allow tolerance of ± $\frac{1}{2}$ square allow full marks from calculation from other **correct** pairs of readings*

allow value in range 13 to 13.4 for $\frac{66}{5}$ only

ignore $\frac{66}{5}$ or 12.6

1

13.2 × 0.8

allow their calculated value in the range from 12 to 14 × 0.8

1

10.56 (mm^3/min)

allow 10.6 or 11

1

(d) points plotted correctly

allow +/- $\frac{1}{2}$ a square
allow 1 mark for 4/5 correct plots

2

suitable line of best fit

1

(e) straight line starting at 0,0 with a steeper gradient than A

1

(f) no photosynthesis

allow plants need light for photosynthesis

1

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(so) stomata closed (as no carbon dioxide needed)

1

(so) no transpiration

*allow very little transpiration **or** little water lost*

1

[13]

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