Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 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

Downloaded from www.merit-minds.com

- 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)

Downloaded from www.merit-minds.com

- (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]

Downloaded from www.merit-minds.com

Q2.

(a) measure the volume of oxygen produced in a given time

or

when more oxygen is produced in a given time the rate of photosynthesis is faster

a reference to rate is needed

allow gas for oxygen

allow when oxygen is produced faster the rate of photosynthesis is faster

ignore the faster the rate of photosynthesis, the more oxygen is produced

allow the slower the oxygen is produced the slower the rate of photosynthesis

or

less oxygen being produced in a given time, the slower the rate of photosynthesis

1

(b) light (intensity)

ignore temperature

1

(c) 20 000 (lux)

allow answers in range 19 500 to 20 500 (lux)

1

(d) there is a cost for heating the greenhouse

1

there is a cost for increasing the carbon dioxide in the atmosphere (of the greenhouse)

allow there is a cost for lighting (in winter)

1

(therefore) the additional costs might exceed the (additional) sale price / profit

or

(additional) costs could not be recovered by increasing the sale price of the tomatoes

ignore these additional costs would reduce profits unqualified

1

(e) when there is no light there is no photosynthesis

1

(so) no oxygen is produced

1

(but) respiration happens (all the time) and oxygen is used

1

(therefore) the net / overall oxygen production is negative / - 2 (arbitrary units)

*do **not** accept an answer of -2 (arbitrary units)*

unqualified

1

[10]

Downloaded from www.merit-minds.com