Mark schemes

Q1.

(a) echidna: 27 to 35 **or** by 8 (°C)

allow a tolerance of ± 0.5 (°C)

and

human: 36.2 to 37.2 **or** by 1 (°C)

allow a tolerance of ± 0.1 (°C)

1

echidna is more variable

or

human fluctuates less

*allow echidna is 7 (°C) more variable for **2** marks*

*allow echidna is 8 times more variable for **2** marks*

1

(b) loses less energy (from its body)

allow loses / wastes less heat

1

(so) body energy store lasts longer

allow glycogen / fat lasts longer

allow stored food lasts longer

1

OR

lower temperature gradient (between echidna and air) (1)

(so) loses less energy (1)

allow loses less heat

OR

less energy transferred maintaining (higher) body temperature (1)

allow less energy transferred for keeping warm

(so) more energy available for processes vital for life (1)

allow more energy for eg heart / brain function

ignore metabolism

1

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

*do **not** accept energy used for respiration*

(c) activity / movement requires energy from respiration

1

(and) respiration / metabolism releases heat (which increases body temperature)

1

OR

respiration / metabolism releases heat (which increases body temperature) (1)

(which) increases the rate of chemical reactions
or
increases enzyme activity (1)

*do **not** accept energy produced / made / created **once** only*

1

(d) more blood flow near surface (of skin)
or
more blood flow to the skin

*do **not** accept blood vessels move nearer to surface of skin*

1

(so) more heat / energy is lost (from the blood)

1

cools blood which cools the body

ignore cools blood / body unqualified

1

(e) $\frac{20\,000 \times 40}{100 \times 2.5}$ **or** $\frac{8000}{2.5}$

1

3 200 (cm^3)

1

3.2 (dm^3)

allow an incorrectly calculated value correctly divided by 1000

1

(f) to replace ions / salt lost (in sweat)

allow named example such as Na^+

allow because ions / salt lost in sweat

allow to prevent (muscle) cramp

1

[13]