

Mark schemes

Q1.

- (a) 46 000
- or**
- 16 400
- or**
- 12.8
- or**
- 0.8

1

46 000 **and** 16 400
or
 262 400

1

46 000 **and** 209 920
or
 3593.75

1

2191.3
or

$$\frac{46\,000 \times 10\,000}{209\,920}$$

or

$$\frac{3593.75 \times 10\,000}{16\,400}$$

1

2190

1

- (b) suitable scale, symmetrical around 0

1

labels for x-axis
and for bars

*(biomass in) kg**(bars) maize and chickens*

1

correct values plotted:

chickens 2200

maize 4200

*allow a tolerance of $\pm\frac{1}{2}$ small square**ignore height of bars*

1

- (c) $\frac{2200}{4200}$ 1
- = 0.5238... : 1
- or**
- 11 : 21
- or**
- 1 : 1.9
- allow rounded value* 1
- (d) lost via egestion / faeces
- ignore urine / excretion / waste*
- ignore not digested*
- do **not** accept respiration*
- do **not** accept not eaten*
- do **not** accept movement **or** as*
- heat **or** for keeping warm* 1
- (e) lysine and tryptophan 1
- (f) any **one** from:
- chickens need low amounts of leucine (for growth)
*do **not** accept leucine is not needed (for growth)*
 - (chicken) proteins contain low amount / proportion of leucine 1
- [13]**

Q2.

(a) evaporation

allow vaporisation

1

(b) osmosis

*allow diffusion**ignore absorption*

1

(c) any **two** from:

- photosynthesis
- support

*allow turgor**allow to fill vacuole**allow opening of stomata**allow to prevent wilting*

- (solvent for) transport

*allow (as a) solvent***or**

translocation

orfor the transpiration stream*allow (as a) medium for chemical reactions**allow hydrolysis / digestion / breakdown of stored food**allow cooling**allow making cytoplasm*

2

(d) *substitution*

$$\frac{21\,800}{1\,700\,000} \times 100$$

1

1.282(3529)

allow 1.28 or 1.3

1

comparative efficiency

$$\frac{4.098}{1.282}$$

1

3.196.....

*allow an incorrectly calculated value for efficiency
correctly substituted*

1

significant figures

3.20

*do **not** accept 3.2*

*do **not** accept if a unit is given*

1

(e) less energy lost as heat

allow less heat lost

allow less energy lost keeping warm

***or** less energy for maintaining body temperature*

1

less energy lost in movement

ignore less movement

ignore less energy lost unqualified

ignore controlling diet

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

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

1

(f) any **two** from:

- increased spread of disease

or

increased use of drugs / antibiotics (to reduce disease))

allow diseases spread (more) easily

- more antibiotics in meat / milk
- (extra) cost of heating / lighting / food / drugs

allow (extra) energy used for heating / lighting

ignore (extra) cost unqualified

- aggressive behaviour (causing harm)

or

‘emotional’ stress reduces productivity

ignore cruelty / unethical

ignore need to clean out barns / sheds

ignore need to maintain / build barns

2

[13]