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Rewarding Learning

General Certificate of Secondary Education
2012–2013

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

MONDAY 27 FEBRUARY 2012
9.30 am–10.30 am

MARK
SCHEME

1

Feature \ Animal Group	Annelids	Insects	Chordates
Backbone	✗	✗	✓
Chaetae	✓	✗	✗
Exoskeleton	✗	✓	✗

One mark for each correct column [3]

2 (a) large surface area/extension

(accept description, allow pores) [1]

(b)

Mineral	Function
Calcium	cell walls/cements cell walls together (**not** makes cellulose)
Nitrogen	amino acids/proteins (**not** growth)
Magnesium	chlorophyll/helps photosynthesis/ stops leaves going yellow

[3]

(c) Advantages – Any two from (all points relate to FYM):
- FYM is cheaper
- makes use of an animal byproduct or "waste"
- helps retain soil moisture
- slow release of nutrients
- improves soil structure or improves drainage or improves crumb structure or adds humus to the soil
- free/costs less
- organic
  (Do **not** accept: natural is not harmful to the environment, can only be spread at certain time of the year/time of application)

Disadvantages – Any two from (all points relate to FYM):
- FYM is smelly **or** mucky to apply
- the nutrient content varies or is not known as precisely
- slow release of nutrients i.e. not fast enough for the crop to grow
- uses up more space for storage than bags of artificial fertiliser
- seepage from storage pits can cause water pollution
- more difficult to apply or takes longer to put out manure
- don't know nutrient content
- don't know what is in it/might have harmful bacteria
- could be harmful to the environment/seepage/run-off
- FYM not as readily available [4]

3 **(a)** Any two from:
- hormone is a chemical messenger/signal
- produced by a gland
- that is carried in the bloodstream/blood
- to the target organ where it acts   [2]

(b) insulin is produced in the pancreas   [1]

(c) glucose converted to glycogen (**not** glycerol);
more glucose respired/increased respiration;
stores fat   max [2]

4 **(a)** **(i)** electricity generated and Residential and Transport
(all three needed for mark)   [1]

(ii) $\dfrac{400}{4200} \times 100 = 9.5\%$ decrease

Correct answer – award 2 marks
(400 = 1 mark
/4200 × 100 = 1 mark)   [2]

(iii) more houses use natural gas/double glazing/cavity wall insulation/
roof insulation/roof solar panels/less coal fires/less fossil fuels/
using more renewable/more efficient/conserve energy/become
more economical/people more aware
(Do **not** accept: milder winters, global warming)   [1]

(iv) graph B shows a steady increase (in the percentage of electricity
from renewable sources);
this means less fossil fuels being burned to generate electricity;
so the Electricity generated data (Graph A) show a decrease in
carbon dioxide emissions between 2000 and 2008/Graph A less
electricity generated/less CO_2 produced from 2000 to 2008/less
CO_2 produced because more coming from renewable   [3]

(b) non-living/physical factors
(Do **not** accept an example on its own such as wind etc)   [1]

(c) Any two from:
- carbon dioxide (and other greenhouse gases) act as a blanket/
  acts as a greenhouse
  (Do **not** accept: ozone, hole in ozone layer)
- allow sun's rays to reach the Earth's surface
- but prevent the escape of heat from the Earth's surface/traps
  heat/keeps heat/traps sunlight/prevents sun's rays from leaving
- hence the temperature of the atmosphere and Earth's surface
  increases   [2]

(d) to set targets to reduce global warming/so that not too much pollution/
to check or reduce or prevent global warming/prevent climate change/
in case there is an increase
accept a consequence such as melting polar ice caps   [1]

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5 (a) (biological) catalyst/speeds up rate of reaction or break down
(Do **not** accept example on its own) [1]

(b) (i) amylase [1]

(ii) lock and key model [1]

(c) (i) test tube A
at 5 mins, protease had broken down/digested all the egg **or**
fastest reaction in A **or** only took 5 minutes to work in A;
digestion works best at pH 2 i.e. acid condition (as in stomach)
or works best in acid conditions **or** works best in similar
conditions to stomach [2]

(ii) test tube B
at 20 mins, the protease had broken down/digested all the egg
or took longer to react in B **or** only changed after 20 minutes;
pH 7 is not the optimum for the enzyme **or** protease can only
work in acid conditions [2]

(iii) test tube C
boiling denatures protease;
protein is not broken down/purple shows protein not digested/
protein remains [2]

(Additional mark available for part **(c)** – but allow only one in **(i)**,
(ii) or **(iii)**)
purple colour shows protein present/blue colour is that of Biuret **or**
blue colour means that no protein present
(allow once only)

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6 (a) (i) lots of alveoli/air sacs present;
(large surface area) for oxygen to diffuse into the blood/carbon
dioxide to diffuse out/more gas exchange [2]

(ii) Any two from:
- thin/wall is one cell thick/thin cells
- moist
- permeable
- good blood supply/capillaries
- diffusion gradient/well ventilated/expand [2]

(b) glucose + oxygen – 1 mark each (either order) [2]

(c) Indicative content
- record the initial temperature of the water (in °C)
- set the food alight/burn the food/use Bunsen to set on fire/ heat food sample/burn food completely/relight food if goes out (ignore reference to time)
- hold burning food sample (a set distance) under the test tube
- stir water using stirrer
- record the final temperature of the water
- calculate the temperature increase of the water
- repeat with other food sample
- use same volume of water/same amount of stirring/hold food same distance from test tube
- repeat with biscuits/cheese (must be replicates)
- if replicates – then allow point of working out average temperature rise
- use balance to weigh foods
- measure water with measuring cylinder

Response	Mark
Candidates must use appropriate specialist terms throughout using at least 5 of the above points to describe how they would collect data and explain, in a logical sequence, how they would calculate and compare the energy released from equal masses of biscuit and cheese. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5–6]
Candidates must use some appropriate specialist terms throughout using 3 or 4 of the above points to describe how they would collect data and partially explain, in a logical sequence, how they would calculate and compare the energy released from equal masses of biscuit and cheese. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3–4]
Candidates describe using 1 or 2 of the above points how they would collect data or explain how they would calculate and compare the energy released from equal masses of biscuit and cheese using some or all of the above points. However, these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1–2]
Response not worthy of credit.	[0]

[6]

12

7 **(a)** Any three from:
- men up to age 44 years higher cholesterol than women/younger men have higher cholesterol than women (comparison needed)
- from age 45 years and older women always have higher cholesterol than men/older women have higher cholesterol than men
- cholesterol increases in men up to 55–64 years then declines
- cholesterol increases in women up to 55–64 years then declines
- women have higher cholesterol levels when older
- 55–64: highest cholesterol levels for both **or** both same at 16–24

[3]

(b) reference to graph Y: increasing circulatory illnesses;
reference to graph X: because of increasing cholesterol levels; [2]

(c) Any two from:
- obesity
- high blood pressure
- diabetes
(Do **not** accept: heart disease, strokes) [2]

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8 **(a) (i)** more species in grassland A/more types of plants/more flowers
(do **not** accept: more plants) [1]

(ii) soil moisture/soil fertility or nutrient status/soil pH/temperature
(do **not** accept: light) [1]

(b) Indicative content
- for grassland A, set down two tape measures at right angles
- generate random co-ordinates (random number tables or computer)/throw at random
- set quadrat
- record number of plant species within the quadrat/record types of plants (**not** % cover)
- identify plant species/use keys
- record/write down the results
- repeat/throw several times
- divide total numbers (in each quadrat) by number of quadrats/ calculate average number of species per quadrat
- repeat for grassland B/other area [6]

| Response	Mark
Candidates must use appropriate specialist terms throughout using at least five of the above points to describe how they would have carried out this investigation and explain, in a logical sequence, how the pupils would have obtained these results. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5–6]
Candidates must use appropriate specialist terms throughout using 3 or 4 of the above points to describe how they would have carried out this investigation and partially explain, in a logical sequence, how the pupils would have obtained these results. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3–4]
Candidates describe using 1 or 2 of the above points how they would have carried out this investigation or explain how the pupils would have obtained these results using some or all of the above points. However, these are not presented in a logical sequence. They use limited spelling, punctuation and grammar and they have made little use of specialist terms.	[1–2]
Response not worthy of credit.	[0]

(c) (i) net/sweep net [1]

(ii) Any two from:
- grassland A has more flowering plants (photograph) or higher biodiversity (bar chart);
  (accept reference that A has more flowers or more plants than B)
- so more nectar sources/more food
- so more butterflies [2]

(d) (i) pyramid of numbers
robin   slightly wider bar than for rose bush
caterpillar   widest bar
rose bush   narrowest bar
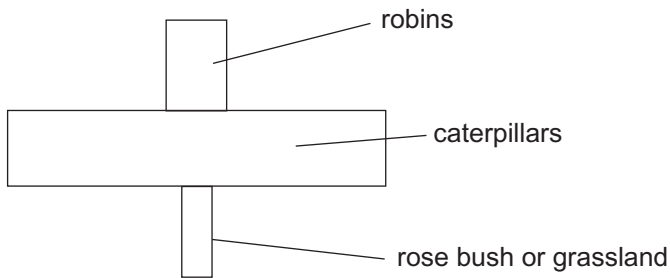
(1 mark for rose bush narrowest at the bottom or 1 mark if no labels;
2nd mark for caterpillars bigger than robins, and robins need to be bigger than rose bush) [2]

(ii) robin   narrower bar than for caterpillar
caterpillar   narrower bar than for rose bush
rose bush   widest bar
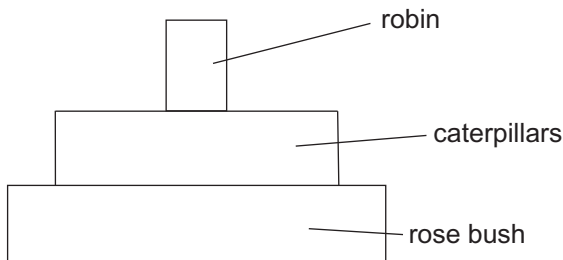
1 mark rose bush widest at bottom;
1 mark caterpillar wider than robin,
1 mark correct but no labels. [2]

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Total | **70**