

Mark scheme for Easter Holiday Homework – 11Y1

Q1.

- (a) 7.15 to 7.45 am and 7.15 to 7.45 pm
both required, either order accept in 24 hr clock mode
- (b) (i) 11
- (ii) 32.5 to 33
allow answer to (b)(i) + 21.5 to 22
- (c) any **two** from:
- more photosynthesis than respiration
 - more biomass / carbohydrate made than used
allow more food made than used
 - so plant able to grow / flower
accept plant able to store food

1
1
1
2 [5]

Q2.

- (a) Pituitary
- (b) $\frac{10-4}{4}$ **or** $\frac{6}{4}$
= 150 (%)
- (c) the level in the blood is already higher than it was before point **A**
levels hadn't returned to normal yet (before the next scare)
allow he had already been scared so he was expecting the second scare
- (d) increased oxygen to brain / muscles
increased glucose to brain / muscles

1
1
1
1
1
1 [7]

Q3.

- (a) any **three** from
increased thickness **or** build up for attachment of zygote **or** so zygote can implant;
allow gives more room for blood vessels
- increased blood vessels to provide nutrients for zygote;
allow embryo or fetus or baby or egg for zygote
- becomes thicker to form placenta;
increased surface area for attachment of zygote;
increased glands for secretion;
- (b) (i) rise in hormone corresponds with rise
in temperature;

3

allow peak of hormone at same time as increased temperature or when hormone high, temperature is high allow change in hormone concentration followed by change in temperature or when hormone rises followed shortly by rise in temperature or graphs follow same pattern or graphs are nearly the same

- (ii) maximum 36.90 °C 1
 minimum 36.55 °C; 1
 0.35 °C;

allow **both** marks for correct answer **or one** mark for 0.35 if clearly round up **or** round down allow one mark for working if correct

1 [6]

Q4.

- (a) (i) 120 1
- (ii) 11 760 **or**
 correct answer from candidate's answer to (a)(i)
correct answer with or without working
if answer incorrect
 120 × 98 **or**
 candidate's answer to (a)(i) × corresponding SV
 gains **1** mark
if candidate uses dotted line / might have used
*dotted line(bod) in (a)(i) **and** (a)(ii) no marks for*
(a)(i) but allow full ecf in (a)(ii) eg 140 x 88 = 12320
 gains **2** marks 2
- (b) trained athlete has higher stroke volume / more blood per beat 1
 same volume blood expelled with fewer beats
or for same heart rate more blood is expelled 1
- (c) increased aerobic respiration 1
or
 decreased anaerobic respiration
allow correct equation for aerobic respiration
accept don't have to respire anaerobically
- increased energy supply / need 1
- less lactic acid formed 1
or to breakdown lactic acid **or** less O₂-debt 1
- can do more work **or** can work harder / faster / longer 1
accept muscle contraction for work
or less fatigue / cramp / pain

1 [9]

Q5.

- (a) use of quadrat / point frame 1
allow description
- randomly placed / random sampling 1
ignore reference to transects
- (b) (i) 6 1
- (ii) more light in A / in field / where sunny 1
ignore sun
- more / better / faster photosynthesis in A / with more light 1

allow converse

- (iii) use light meter / measure light intensity in both habitats
take many measurements at same time of the day

Or laboratory / field investigation with 2 batches high light and low light (1)
count or number of flowers in each (1)
counting point is dependent on investigation point

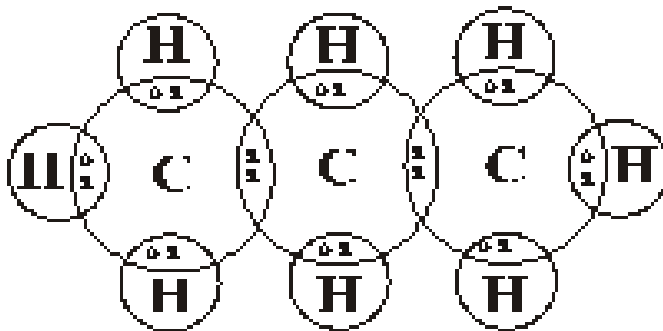
- (c) more glucose / energy available
allow other named product eg protein
allow if more energy produced

for growth dependent on 1st mark

1 [9]

Q6.

(a)



allow all dots or
all crosses or
combination or
all e / e⁻ or –
or other suitable symbols
centre of symbols must be on or inside overlapping
areas within reason

- (b) (i) any **two** from:
- no change initially or stays constant at the beginning
 - increase
 - slowly at first and then more rapidly
- accept converse arguments
allow vapour pressure is 0 at any temperature <–
100°C for 1 mark
accept positive correlation
accept explanation based on kinetic theory eg
particles have more kinetic energy
allow reasonable attempt at using numbers

(ii) –44 (using graph) accept –43 to –45

- (c) • intermolecular forces / bonds or forces / bonds between molecules
• bonds / forces are weak
covalent bonds are weak = 0 marks
if they do not gain either of the marks on the left
then allow simple covalent / molecular / made of
small molecules for 1 mark

- Q7.** (a) (s) (aq) (aq) (g)
must be in this order
2 marks if all four correct
1 mark if 2 or 3 correct
- (b) (i) 55 2
ignore units
- (ii) 54 1
allow ecf from (b)(i)
- (iii) 0.92 1
correct answer with or without working gains 2 marks
ecf from volume in (b)(i)
accept 2 d.p. up to calculator value
if answer incorrect, allow rate = (b)(i) / 60 for 1 mark
- (c) (i) circle round point at (48,22) 2
- (ii) problem (1) and explanation (1) 1
*explanation **must** give lower volume of gas or slower reaction*
ignore human error unless qualified
problem with bung
 e.g. bung not placed in firmly / quickly enough
 so gas lost
or
problem with reagent
 e.g. acid was diluted **or** acid not replaced
 so reaction slower **or**
problem with temperature
 e.g. temperature was lower than recorded temperature
 so reaction slower **or**
problem with measurement
 e.g. length of magnesium less than 8 cm **or** timed for less than

- a minute
so less gas produced 2
- (d) repeat the experiment (several times) 1
- because anomalous results could be excluded 1
- and then the mean can be determined / calculated
accept suggestion of alteration to method, which is explained as to why it would reduce the error, for 3 marks (e.g. place the magnesium in a container within the flask (1) so it can be tipped into the acid once the bung is in place (1). This will prevent anomalous results or gas loss (1))
ignore idea of more accurate gas syringe
ignore shorter time intervals 1
- (e) (i) use clean magnesium **or** use magnesium without oxide coating 1
- compare results 1
- (ii) **either** 1
- measure the temperature of the acid before (adding magnesium) 1
- and after adding magnesium **or** place the conical flask in a water bath (at 40 °C) (1) compare results (1) 1
- [16]**

Q8.

- (a) (i) acid rain
accept consequences of acid rain
allow asthma / bronchitis
ignore toxic gas 1
- (ii) global dimming
accept dimming alone 1
- (b) (i) **sustainable:**
maximum **two** from:
 - crops (that produce oil) can be grown in most places owtte
 - renewable
 - use less fossil fuels / diesel
 - use (refined) waste oils**low pollution:**
maximum **two** from:
ignore references to CO₂ here
 - most emissions are lower **or** any two named emissions from CO / SO₂ / PM₁₀ are lower
 - much / lot less SO₂ emissions (than the others) owtte
 - accept spillages / waste is biodegradable
 - less new CO₂ **or** (more) carbon neutral 3
- (ii) plants / photosynthesis use carbon (dioxide) from the air* 1
- it / biodiesel releases carbon (dioxide) from plants / crops /

photosynthesis*

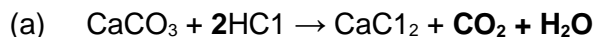
(*) allow 1 mark for biodiesel is (more) carbon neutral

1

(fossil) diesel releases 'locked up' / new carbon (dioxide) / doesn't absorb CO₂ / absorbed it millions of years ago

1

Q9.



one mark for CO₂ and H₂O or H₂CO₃

one mark for balancing the equation

2

(b) (i) linear suitable scale for y axis

± one small square

1

accurate plots

deduct one mark for each error plot

1

smooth curve through the points or a line of best fit

this mark requires a neat smooth curve

1

(ii) curve becomes almost horizontal at or above 268.5

do not credit a straight line reaching 268.5 at 11 mins

accept a plot at 268.6

1

(iii) steeper initial part to curve

1

becoming nearly horizontal between 268.6 and 268.4 g

1

[8]

Q10.

(a) products are at a lower energy level than reactants

if candidate has drawn a profile for an endothermic reaction penalise first marking point only

1

activation energy correctly drawn and labelled

1

ΔH correctly labelled

1

(b) (i) -93 (kJ per mole)

correct answer with or without working gains 3 marks

allow 2 marks for +93 kJ per mole

if any other answer is seen award up to 2 marks for any two of the steps below:

bonds broken (614 + 193) = 807 (kJ) or (614 + 193 + (4 × 413)) = 2459(kJ)

bonds formed (348 + 276 + 276) = 900(kJ) or 348 +

$(2 \times 276) + (4 \times 413) = 2552(\text{kJ})$
bonds broken – bonds formed
allow ecf for arithmetical errors

- (ii) more energy is released when the bonds (in the products) are formed 3
 formed 1
 than is needed to break the bonds (in the reactants)
*if no other marks gained, allow 1 mark for energy released for bond making **and** energy used for bond breaking* 1

[8]

Q11.

- (a) (i) linear scales used 1
do not credit if less than half paper used
 points plotted correctly 1
all of paper used
 (straight) line of best fit drawn 1
allow a tolerance of \pm half square
 (ii) correct **and** straight line through origin 1
all needed
e.c.f. if their (a)(i) is straight but not through the origin - incorrect because line does not go through origin
credit a calculation that shows proportionality
 (iii) 62 ± 0.5 (m) 1
credit 1 mark for $KE = 490000$ or 490kJ
credit 1 mark for correct use of graph clearly shown 2
 (iv) any **one** from: wet **or** icy **or** worn **or** smooth road
accept slippery slope
 brakes worn
accept faulty brakes
 car heavily loaded
 worn tyres
 downhill slope
do not accept anything to do with thinking distance
e.g. driver tired or drunk 1

(b) (i) acceleration = $\frac{\text{change in velocity}}{\text{time taken}}$

accept correct transformation

accept $\frac{v - u}{t} = a$

accept $\frac{\text{m/s}}{\text{s}} = \text{m/s}^2$

do not accept acceleration = $\frac{\text{velocity}}{\text{time}}$

(ii) 56 *accept – 56*

(iii) deceleration is reduced
accept deceleration is slower
accept acceleration

force on car and or passengers is reduced
accept an answer in terms of change in momentum for full credit

1 [11]

Q12.

(a) electric current
(rate of) flow of (electric) charge / electrons

$I = \frac{Q}{t}$
accept
with Q and t correctly named

potential difference

work done / energy transferred per coulomb of charge
(that passes between two points in a circuit)

$V = \frac{W}{Q}$
accept
with W and Q correctly named

(b) metals contain free electrons (and ions)
accept mobile for free

as temperature of filament increases ions vibrate faster /
with a bigger amplitude

accept atoms for ions
accept ions/atoms gain energy
accept vibrate more for vibrate faster
do not accept start to vibrate

electrons collide more (frequently) with the ions **or**
(drift) velocity of electrons decreases

do not accept start to collide
accept increasing the p.d. increases the
*temperature (1 mark) **and***
(and) resistance increases with temperature (1
mark) if no other marks scored

(c) 7.8

allow 1 mark for obtaining value 1.3 from graph
or allow 1 mark for a correct calculation using an
incorrect current in the range 1.2-1.6 inclusive

2 [7]

Q13.

(a) beta

alpha: would not pass through (the aluminium / foil)

gamma: no change in count rate when thickness changes

must be a connection between detection / count rate / passing through and change in thickness

- (b) foil thickness increases then decreases (then back to normal / correct thickness) 1
a description of count rate changes is insufficient
- gap between rollers decreases, then increases (then back to correct size) 1
or
pressure from rollers increases then decreases
accept tightness for pressure
answers may link change in thickness and gap width for full credit ie:
foil thickness increases so gap between rollers decreases (1)
foil thickness decreases so gap between rollers increases (1)
- (c) 56 (years) 1
accept any value between 55-57 inclusive
allow 1 mark for correct calculation of mass remaining as 1.5 (micrograms)
allow 1 mark for a mass of 4.5 micrograms plus correct use of graph with an answer of 12
maximum of 1 compensation mark can be awarded

2

[7]

Q14.

- (a) half-life read from graph = 2 hours 1
time to fall to 1.56 is six half lives = $6 \times 2 = 12$ (hours) 1
- (b)
$$\begin{array}{c} 210 \\ 82 \end{array} \text{Pb} \longrightarrow \begin{array}{c} 206 \\ 80 \end{array} \text{Hg} + \begin{array}{c} 4 \\ 2 \end{array} \text{He}$$
 3
one mark for each correct element in the equation
- (c) ionising radiation turns atoms into ions 1
which can break up molecules 1
this can change DNA 1
causing mutations to genes 1
which can cause cancer 1

[10]

Q15.

- (a) water boils at the same temperature each time 1
control starting temp by allowing enough time for water and kettle to reach room temperature 1
- (b) uncertainty = $(302 - 298) / 2$ 1
uncertainty = ± 2 (s) 1
ignore missing \pm 1
- (c) (Energy transferred = Power \times time) 1
 $E = 2.20 \times 300$ 1
 $E = 660$ (kJ) 1
allow 660 (kJ) without working shown for 2 marks
allow answer calculated using incorrect value for t (298 or 302) for 1 mark
- (d) (mass \times change in temperature) / mass 1
allow 1 mark for any correct pair of values from the table
eg 20 / 0.25
80 ($^{\circ}\text{C}$) 1
allow 80 ($^{\circ}\text{C}$) without working shown for 2 marks
- (e) four points plotted correctly 2
allow 1 mark for three correctly plotted points
ecf their 5.3
allow $\pm 1\text{mm}$
accurate line drawn 1
line should be straight and drawn with a ruler
line must not go through the origin
- (f) values read correctly from graph 1
correct conversion into J 1
correct use of $\Delta y / \Delta x$ 1
value in range 4200 – 4800 1
allow value in range 4200 – 4800 without working shown for 4 marks
- (g) some of the energy supplied does not raise the temperature of the water 1
some of the energy is wasted is insufficient
- (h) (the power of the kettle may not be 2.2kW) 1
(by measuring the power) the student can accurately calculate the amount of energy supplied to each mass of water 1