

Biology (130 MARKS)
Answer each of the questions 1, 2 and 3.

Question 1. (52 Marks) All Items, (a), (b), (c), etc. (7 × 6 + 1 × 10marks)

- (a) **any *one* from:** organism/ living thing/ plant/ animal/ bacterium... (3)
any *one* from: breaks down (feeds on) (releases materials from) dead plants (dead animals) (organic material) (3) [6]
- (b) **red blood cell:** transports oxygen (3)
white blood cell any *one* from: fights infection (diseases)/ makes antibodies immunity/ kills bacteria (microbes) (3) [6]
- (c) **any *two* from:** reduce burning of fossil fuels/ reduce release of sulfur (nitrogen) oxides/ reduce release of CFCs/ use only unleaded petrol/ reduce release of dioxins/ use smokeless fuels/ treat sewage/ avoid slurry spills/ dispose of waste properly/ recycle/ reuse/ plant trees /stop deforestation/ maintain biodiversity... (2 × 3) [6]
- (d) **phloem, any *one* from:** food/ sugar/carbohydrate/ named soluble sugar e.g. sucrose/ hormone/ named plant hormone (3)
xylem: minerals/ named mineral (3) [6]
- (e) **what?:** chromosomes (3)
role: inheritance/ passing on of characteristics/ produce protein (3) [6]
accept any named inherited character e.g. hair colour
- (f) **why?:** higher pressure/ blood is pumped (3)
difference, any *one* from: no valves in arteries/ veins have valves/ small lumen in arteries/ large lumen in veins (3) [6]
- (g) **(i) vitamins any *one* from:** lack of a vitamin can cause disease/ good skin/ night vision/ prevents scurvy (keeps gums healthy)/ prevents rickets/strong bones/ helps blood clotting/ prevents colds/ used in life processes/ prevents anaemia/ good hair/ gives energy/... (3)
(ii) minerals any *one* from: lack of a mineral can cause disease/ red blood cells (can prevent anaemia)/ strong bones (teeth)/ growth/ healthy nerves / used in life processes/... (3) [6]
note: look for different answers in (i) and (ii)
- (h) **(i) iris, any *one* from:** controls the amount of light entering the eye / controls the brightness of image on retina/ controls size of pupil (3)
(ii) pupil: allows light to enter the eye (3)
Why?, any *one* from: light absorbed/ no light reflected out (4) [10]

Question 2. (39 marks) All items, (a), (b) and (c).

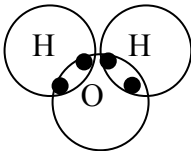
(a) (i) <u>How?</u>	<p>renal arteries: contain waste products (urea) (water) (salts) (waste)...</p> <p>renal veins: contain no waste products (waste) (urea)...</p> <p>If no reference is made, in the answer, to arteries or veins but correct answers appear in the right order allow 3 marks</p> <p><u>alternative answer:</u> ‘more of the <u>waste</u> <u>CO₂</u> in <u>vein</u>’ allow 3 marks</p>	(3)	[6]
		(3)	
(ii) <u>Account</u>	<p>kidneys remove (eliminate) (filter) (excrete) (waste/s) (urea)...</p> <p>from the blood</p> <p><u>alternative answer</u> (matched to alternative answer above): clear reference to <i>respiration</i> allow 3 marks <i>CO₂ produced</i> allow 3 marks</p> <p><u>second alternative answer:</u> blood with waste/s enters the kidney allow 3 marks. Blood without waste/s leaves the kidney allow a second 3 marks</p>	(3)	[6]
		(3)	
(iii) <u>What?</u>	<p>transport (pass) (carry) urine (urea) (water) (salts) (waste/s)...</p> <p>to bladder</p>	(3)	[6]
		(3)	
(b) (i) <u>Name</u>	amylase	(3)	[3]
(ii) <u>Name</u>	starch/ named starchy food	(3)	[3]
(iii) <u>Describe</u>	<p>mix the starch with water/ produce saliva/ cut/ crush/ grind/ grate/ chew bread...</p>	(3)	[3]
(iv) <u>Give</u>	37/ body temperature/ 34-40/ room temperature	(3)	[3]
(v) <u>How?</u>	<p>10 minutes/ 5-30 minutes/ one day <i>matched</i> with room temperature</p>	(3)	[3]
(vi) <u>Describe</u>	<p>add iodine</p> <p>mixture does not turn blue-black/ mixture stays the colour of iodine solution (yellow), (orange), (brown)</p> <p><i>or</i></p> <p>Fehling’s solution/ Benedict’s solution</p> <p>red/ orange/ brown</p>	(3)	[6]
		(3)	
	<p>accept an equivalent experiment using a different enzyme and substrate</p>		

Question 3. (39 marks) All items, (a) and (b).

- (a) (i) Mark Vagina clearly labelled with S, **no arrow required, if an arrow is used the point of the arrow is taken as the part labelled** (3) [3]
- (ii) Mark any part of the fallopian tube clearly labelled with F, **no arrow required, see above.** (3) [3]
- (iii) Explain fusion (joining) (union)/ forms zygote (3)
 sperm (male gamete) and egg (female gamete) (3) [6]
accept sex cell or nucleus for gamete above
allow 6 marks for "sperm enters egg"
- (iv) State **before, any two from:** contractions (muscles in the uterus contract) (labour begins)/ 'breaking of the waters' (liquid, or amniotic fluid or fluid escapes) / cervix dilates(widens)/ baby is pushed through the cervix (into the vagina)/ baby head first/ vagina widens... (2 × 3)
after, any one from: umbilical cord is (clamped) (cut)/ placenta separates from the uterus/ placenta/ (membranes), (cord), (afterbirth) is expelled/ breasts produce milk/ baby handed to mother/ baby cries... (3) [9]
- (b) (i) Write **any food chain from the food web shown.**
- Plant/s \longrightarrow Primary consumer
- e.g. Plant/s \longrightarrow Mouse (3)
- Primary consumer \longrightarrow Secondary consumer
- e.g. Mouse \longrightarrow Dog/ Fox (3) [6]
- accept letters in place of names for organisms**
- (ii) Select **named organism and adaptation matched**
 e.g. mouse has fur/ teeth/ ears/ legs... (3) [3]
- (iii) What? living things (organisms) needing the same resource
or a correct example of competition e.g. plants compete for space (water) (minerals) (light)... (3) [3]
- (iv) Give **any example, from the food web, giving a way, in which, two named organisms depend on each other for survival.** Three possible examples are given below:
 e.g. the butterflies depend on plants for food (3)
 plants depend on butterflies for pollination (3)
or **or**
 e.g. the plants produce O₂ (use CO₂) (3)
 the mouse uses O₂ (produces CO₂) (3)
or **or**
 e.g. mouse eats seeds (berries) (fruit) (3)
 disperse seeds (3) [6]
allow 3 marks for an example of dependence only:
 e.g. birds eat flies (butterflies) i.e. *depend* on them for food

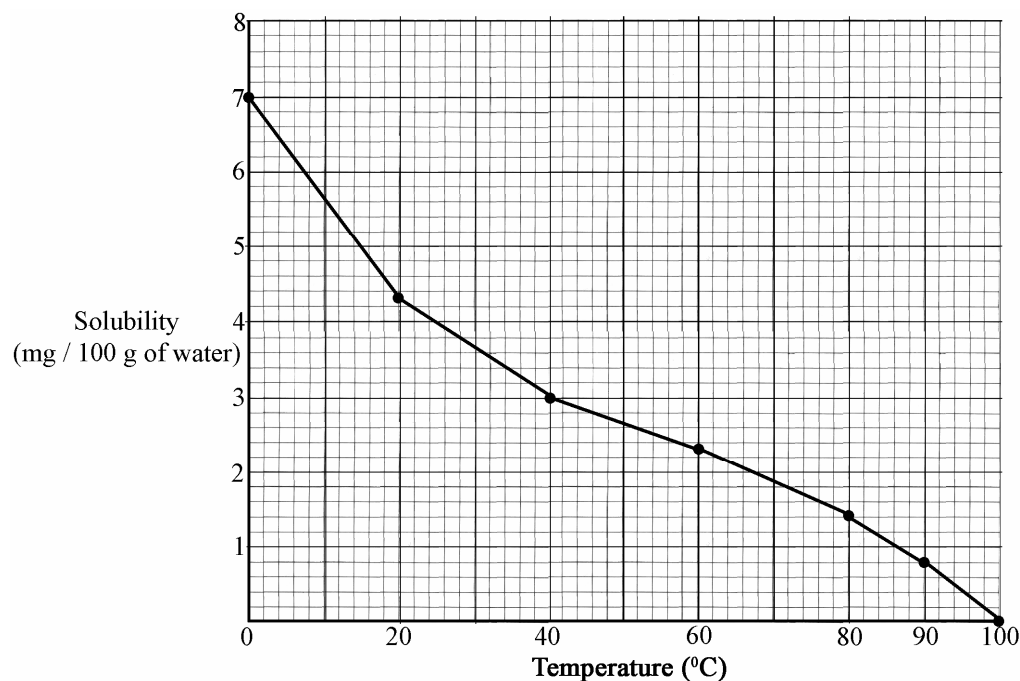
Chemistry (130 MARKS)
Answer each of the questions 4, 5 and 6.

Question 4. (52 marks) All items, (a), (b), (c), etc. (7 × 6 + 1 × 10marks)

- (a) **liquid:** hydrochloric acid (HCl), **accept any suitable named acid.**
accept vinegar (3)
solid: marble/ calcium carbonate/ CaCO_3 / bread soda/ sodium
hydrogen carbonate (sodium bicarbonate)... (3) [6]
accept any named carbonate or hydrogen carbonate
(bicarbonate) including common names e.g. bread soda
- (b) calcium, magnesium, zinc, copper (6) [6]
allow 3 marks if there is one error in listing i.e. 3 out of 4 in correct order
or if the metals listed in order of increasing reactivity
- (c) **charge:** electron negative (-/-ve), proton positive (+/+ve) (3)
mass: electron 'zero'/very small/one 1836th (one 2000th) of the mass
of a proton/ less than a proton
proton 1/ greater than the electron/ $\times 1836$ ($\times 2000$) the mass of an electron (3) [6]
- (d)  two shared pairs shown, one pair between each hydrogen
atom and the oxygen atom (shape not required) (2 × 3) [6]
accept a diagram using dashes/lines to represent
shared pairs
or **or**
correct description: shared pair between first H atom
and O atom, shared pair between second H atom and O (2 × 3)
[no diagram deduct 3 marks]
allow 3 marks: for a diagram showing two shared pairs
(two single bonds) in 'HO'₂ (wrong formula)
- (e) **precaution shown in photo, any one from:** wearing goggles/ looking through
wall (side) of test tube/ tube in holder/ apparatus in centre of bench (3)
precaution when heating, any one from: point tube away/
add boiling chips to a liquid/ use small amounts/ lab coat/
heat gently/ screen/ gloves/ tie hair back... (3) [6]
- (f) **name, any one from:** enamelling/ coating with plastic/ chromium/ plating/
galvanising (coating with zinc)/ greasing(oiling)/ alloying (mixing with other
metals)/ named alloy e.g. stainless steel/ painting (3)
how?: prevents air or water contacting (reacting with) the iron, only one
required (3) [6]
- (g) **fossil fuel:** fuel produced from dead animals and plants (3)
allow 3 marks for a named fossil fuel, excluding natural gas
main constituent: methane (CH_4) (3) [6]
- (h) (i) white (2)
(ii) blue *stayed* blue and red *turned* blue (2 × 2)
(iii) the product (it) is a base (alkali) (4) [10]
note if colour change in (ii) above is given 'blue turns red' give no marks for
(ii) but if the candidate then gives 'acid' in (iii) i.e. matched colour change
and conclusion allow 4 marks.

Question 5. (39 Marks) All items, (a), (b), (c), etc.

(a) (i) Draw



four points plotted correctly

(3)

curve drawn correctly (through the points)

(3)

[6]

(ii) Use

3.6 **allow** +/- 0.3

(3)

[3]

(iii) What?

solubility decreases
as temperature increases

(3)

or

solubility increases
as temperature decreases

(3)

or

(3)

(3)

[6]

(iv) What?

less oxygen
for respiration (breathing)/ fish (animals) die

(3)

(3)

[6]

(b) (i) Define

number of protons (positive charges in the nucleus)/
number of electrons in a *neutral atom*

(3)

[3]

(ii) Explain

same number of protons / same atomic number/ same element
different number of neutrons/ different mass number

(3)

(3)

[6]

(iii) What?

alkaline earth

(3)

[3]

(iv) Why?

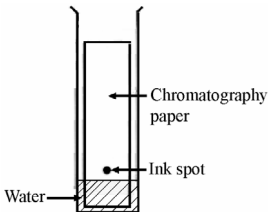
outer orbit (shell) (energy level)
'full' of electrons/ octet (eight electrons)/ stable

(3)

(3)

[6]

Question 6. (39 marks) All items, (a), (b) and (c).

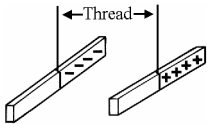
- (a) (i) What? attractive (electrical) force (3)
between positive and negative (oppositely charged) ions (3)
or **or**
some candidates may describe the formation of an ionic bond, allow marks for this answer as follows:
transfer of electron/s from one atom to another (3)
charges (ions) attract each other (3) [6]
note: this answer may be given as a diagram or an equation
allow 3 marks for: bond between a metal and a non-metal
- (ii) Name/ **name:** table salt, copper sulphate (2 × 3)
Give **allow 3 marks for 'B'**
reason: conduct electricity/ bulb glows (3) [9]
- (iii) Why? allow the particles to move/ the solids would not conduct/ water breaks ionic bonds (3) [3]
- (b) Classify **acidic:** lemon juice/ soda water (3)
basic: tooth paste/ lime water (3)
neutral: pure water (3) [9]
- (c) (i) Describe  **show or state**
chromatography (filter) paper (3)
ink spot on paper above water (3)
water (3) [9]
[no diagram deduct 3 marks]
- (ii) How? **any one from:** no separation (only one colour) for an ink composed of a single colour/ separation (more than one colour) for an ink composed of a mix of coloured inks (3) [3]

Physics (130 MARKS)
Answer each of the questions 7, 8 and 9.

Question 7. (52 marks) All items, (a), (b), (c), etc. (7 × 6 + 1 × 10marks)

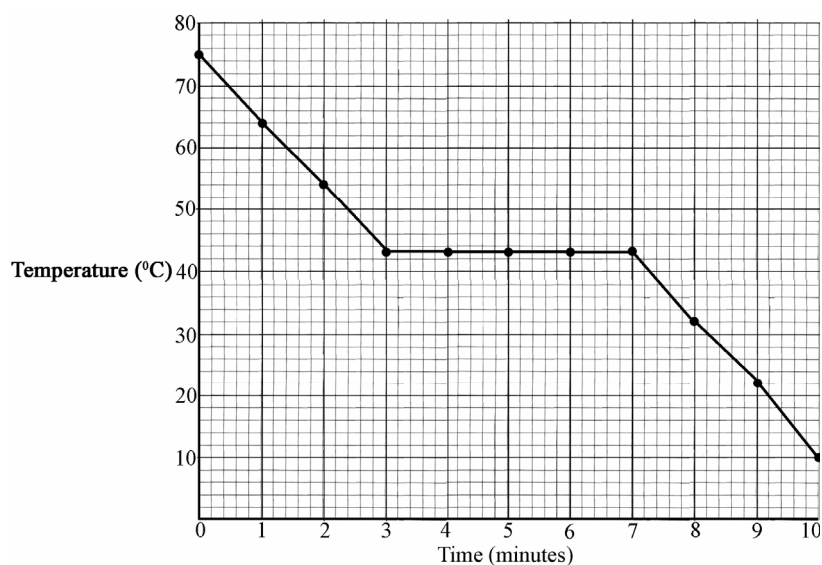
- (a) (i) potential/ stored (3)
(ii) kinetic (3) [6]
- (b) anticlockwise moment (turning effect) (3)
equals (balances) clockwise moment (turning effect) (3) [6]
note: equals (balances) can be with either statement
accept: ‘left’ and ‘right’ for the directions of rotation in place of anticlockwise and clockwise
- (c) **any two from:** weight/ keeps things on the surface of the earth/ causes to fall... (2 × 3) [6]
- (d) **any two from:** A is blue/ B is green and yellow (**accept** green alone)/ C is brown (2 × 3) [6]
- (e) **advantage, any one from:** renewable/ no pollution/ does not increase global warming/ secure energy source/ wave energy is ‘free’... (3)
disadvantage any one from: energy of waves vary/ storms could damage (destroy) the device/ corrosion problems/ ‘fouling’ (build-up) by (of) sea creatures/ danger to shipping/ cost/ problems getting electricity ashore/ no waves... (3) [6]
- (f) **any two from:** heat is a form of energy (temperature is not a form of energy)/ temperature can be measured at a point (heat can not be measured at a point)/ heat is measured in Joules/ temperature is measured in °C (K)/ differences in temperature causes heat to move / temperature is degree of hotness (how hot or cold something is)/ heat depends on mass (temperature does not depend on mass)/ heat depends on the type of substance (temperature does not depend on the type of substance)... (2 × 3) [6]
- (g) **is?:** reflection (3)
any one from: water surface acts like a mirror/ water surface is flat/ mirror image/ image ‘appears’ on surface/ light does not enter water... (3) [6]
- (h) alternating current changes direction, direct current moves in the same (fixed) direction (2 × 3)
accept correct voltage vs. time graphs for a.c. (e.g. sine wave) and for d.c. (line parallel to time axis) for (2 × 3)
220-240 (4) [10]

Question 8. (39 marks) *All items, (a), (b), (c), etc.*

- (a) (i) How? the rods can be charged by friction (rubbing) (3)
with a cloth (3) **[6]**
- (ii) Describe
What?  **show or state**
suspend rod/s (3)
bring the rods close/ together (3)
result: the rods attract each other (3) **[9]**
[no diagram deduct 3 marks]
- (iii) Explain dampness/ moisture/ water (3)
allows electric charge to move (escape)/ earthed/
does not allow charge to build up... (3)
or **or**
assume dry conditions if candidate answers as below:
charge builds by friction with wheels (3)
charge does not leak away (3) **[6]**
- (b) Give **any one from:** magnifying glass/ microscope/ camera/
projector/ binoculars/ telescope/ spectacles (glasses)/
start a fire/ focus infra red (IR) (heat)/spotlight... (3) **[3]**
- (c) (i) What? mixture of different coloured lights (made of many
colours)/ colours listed (3) **[3]**
- (ii) What? dispersion (3) **[3]**
- (iii) What? spectrum (3) **[3]**
- (iv) State **X** is red (3)
Y is violet/ purple (3) **[6]**

Question 9. (39 marks) All items, (a) and (b).

(a) (i) Draw



six points plotted correctly (6)
or
 three points plotted correctly (3)
 curve drawn correctly (through the points) (3) **[9]**

(ii) Explain cooling (temperature falls) (graph shows decrease in temperature) (3)
 liquid to solid/ change of state/ latent heat (3)
 cooling (temperature falls) (graph shows decrease in temperature) (3) **[9]**

(iii) Use 43 +/- 1 (3) **[3]**

(b) (i) Name light/ photons (3) **[3]**

(ii) Name chemical (3) **[3]**

(iii) Give chemical to electrical (3)
 electrical to light (3) **[6]**
note: chemical to electrical to light merits (2 × 3)
allow 3 marks for: chemical to light

(iv) Identify LED (light emitting diode) (3)
Give **any one from:** use very little energy (current)/ cheap/
 reliable/ can be switched on and off rapidly without 'blowing'/
 long lasting/ fit into small spaces/ arrays (lots) can be used/
 energy efficient/... (3) **[6]**