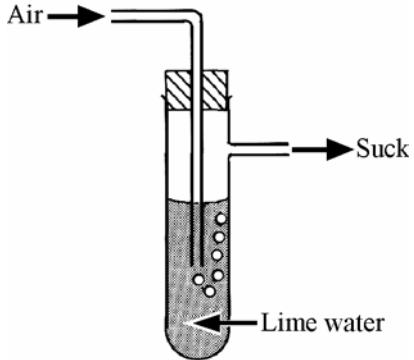


Biology (130 MARKS)
Answer each of the questions 1, 2 and 3.

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

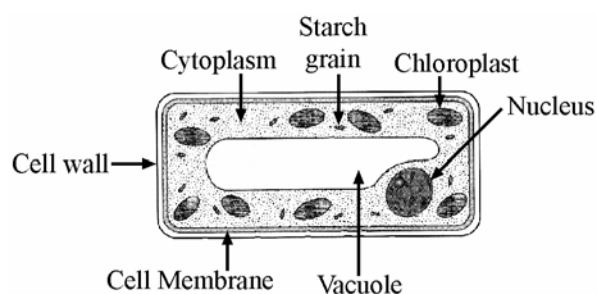
- (a) humerus (3)
 hinge/ synovial (3) **[6]**
- (b) **any two from:** bacteria/ fungi/ worms/ maggots/ nematodes/ woodlice/ ants
 protozoa/ springtails/ silver fish/ beetles... (2 × 3) **[6]**
- (c) transpiration (3)
 turns anhydrous (grey) (white) copper sulphate blue
or blue cobalt chloride pink/ cobalt chloride paper pink
or boils at 100 °C (3) **[6]**
- (d) air entering tube **as shown** (3) (3) **[6]**
 gas being removed **as shown** (3)
or
 air moving on the right direction
 shown by only one arrow (3)
 limewater labelled (3)
[no diagram no marks]
- 
- (e) ovulation/ release of egg (gamete) (3)
 thickens (gets larger)/ rich blood supply/prepares for implantation (3) **[6]**
- (f) chromosomes (3)
 DNA (3) **[6]**
- (g) **any one: ‘how it works’ (3) and any one: advantage/ disadvantage (3)** (3)
composting: plant (food) wastes are allowed to rot; safe/ useful product/
 reduces use of landfill/ slow/ composter required... (3)
or
incineration: waste is burnt; toxic (medical) waste made safe/ possible air
 pollution... (3)
landfill: waste is put into the ground; quick/ leaching (effluent)/ long term
 management required... (3)
recycling: waste material is made into new items/ re-used/ saves resources/
 doesn't go into landfill/ infrastructure (recycling plants) required... (3)
(accept equivalent answers) (3) **[6]**
- (h) **result: any one from covered area or uncovered area**
covered area: no blue-black/ iodine stays yellow(orange)/no starch produced
uncovered area: goes blue-black/ starch produced (6)
allow (3) for no starch/ iodine stays yellow(orange) alone
conclusion: light required for starch (food) production (photosynthesis) (4) **[10]**

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

- (a) (i) Name alveoli(us)/ air sac (3) [3]
- (ii) How? carbon dioxide (CO₂) enters/ CO₂ leaves the blood (capillaries) (3)
- Oxygen (O₂) leaves/ O₂ enters the blood (capillaries) (3) [6]
- allow** (6) for 'diffusion'
- (b) (i) Name **any two from:** platelets/ red corpuscles (cells)/ white corpuscles (cells) (accept plasma) (2 × 3) [6]
- (ii) Give **any two from matched:** clot blood/ transport (carry) oxygen (O₂)/ fight infection/ kill germs/ make antibodies/ transports cells (food) (waste) (hormones)... (2 × 3) [6]
- (iii) Why? pumps blood around the body (accept right ventricle is thinner as it pumps blood around the lungs) (3) [3]
- (c) (i) What? heart beat (pumping blood)/ changes in blood pressure in an artery (3) [3]
- (ii) How? count the beats (pulses) (3)
- for one minute (3) [6]
- (iii) Account **rise:** need more oxygen (food) (energy)/ need more carbon dioxide removed (3)
- fall:** need less oxygen (food) (energy)/ need less carbon dioxide removed (3) [6]

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

- (a) (i) What? **any two from:**
protein: growth/ repair (**accept** 'energy')
accept body (muscle) building for protein
carbohydrate: energy
fat: energy/ insulation/protection
fibre: helps prevent constipation (2 × 3) [6]
sodium: water balance...
- (ii) Explain choose the number of helpings (3)
of each food group per day (3)
or **or**
any two from: eat some from each layer/ (3)
eat more from the bottom/ eat less from the top (3) [6]
- (iii) Which? **cheese, meat or fish: B** (3)
chips or crisps: A (3) [6]
- (b) (i) What? **A:** magnify (enlarge) (make bigger)/ view (3)
B: hold (support) slide (specimen) (3) [6]
- (ii) Describe put piece of tissue on slide (3)
in water/ in iodine/ cover with slip (3) [6]
- (iii) Draw



any three clearly labelled (3 × 3) [9]
[no diagram no marks]

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 × 10 marks)

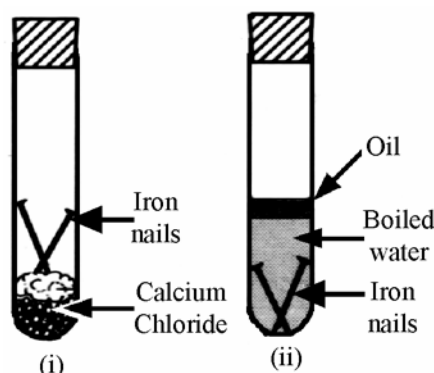
- (a) same atomic number/ same number of protons/ same nuclear charge/ atoms of the same element (3)
different mass number/ different number of neutrons/ different nuclear mass (3) [6]
- (b) hydrogen peroxide (H₂O₂), manganese dioxide (MnO₂) (3)
manganese dioxide (MnO₂) (3) [6]
- (c) sulfur (sulphur) dioxide/ SO₂ (3)
(accept sulfur (sulphur) trioxide/ SO₃) (3)
erosion/ dissolves/ damages (3) [6]
- (d) evaporate/boil off all the water/ distill (3)
residue (solid) (deposit) (3) [6]
- (e) same size pieces/ same acid/ same concentration (strength)/ same temperature/ same volume (amount) (mass) (3)
calcium, magnesium, zinc , copper/ Ca, Mg, Zn, Cu (3) [6]
- (f) 2,8 (3)
8,1 (3)
allow (2 × 3) marks for a correct diagram [6]
- (g) CaCO₃ (3)
H₂O (3) [6]
- (h) help (improve) electrical conductivity/ produce ions/ so it conducts/ enable electrolysis (the reaction)/ water is a poor conductor (3)
burns with a ‘pop’ (sound) (3)
two hydrogen atoms to one oxygen atom/ H : O = 2 : 1/
twice as much hydrogen as oxygen/ formula is H₂O (4) [10]

(a)	(i) <u>Name</u>	<p>A-burette or B-pipette if both are named but mismatched with A and B allow (3)</p>	(3)	[3]
	(ii) <u>Describe</u>	<p>read volume before and after release subtract or set to zero read at end or read volume of acid at colour change</p>	<p>(3) (3) or (3) (3) or (3) (3)</p>	[6]
	(iii) <u>Name</u>	<p>hydrochloric acid sodium hydroxide/ sodium carbonate accept correct formulae HCl (3); NaOH/ Na₂CO₃ (3) [calcium carbonate no marks]</p>	<p>(3) (3)</p>	[6]
	(iv) <u>Write</u>	<p>HCl + NaOH NaCl + H₂O accept HCl + Na₂CO₃ NaCl + H₂O + CO₂</p>	<p>(3) (3) or (3) (3)</p>	[6]
(b)	<u>Give</u>	<p>A: any one from: flexible/ tough/ hard wearing/strong/ can be formed into fibres (filaments) (bristles)...</p> <p>B: any one from: can be moulded/ light weight/ rigid/ does not corrode/ colourful...</p> <p>accept 'strong' once only for A or B</p>	<p>(3) (3)</p>	[6]
(c)	(i) <u>What?</u>	different colours appear (separation)	(3)	[3]
	(ii) <u>What?</u>	colour remains the same (no separation)/ moves up	(3)	[3]
(d)	<u>Give</u>	<p>gas: no fixed shape (volume)/ takes volume of container/ compressible/ expansible/ diffuses/ lower density/ flows...</p> <p>solid: definite shape (volume)/ incompressible/ higher density/ does not flow...</p> <p>(accept 'does not diffuse' for solid)</p>	<p>(3)</p>	[6]

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

- (a) (i) Why? gases expand (contract) on heating (cooling)
matched
or compare (measure) volumes at same temperature
or volume of gas depends on temperature (3) [3]
- (ii) Why? oxygen removed (used)/ only some air reacts (3) [3]
- (iii) What? nitrogen (3) [3]
- (iv) Give **any one from:**
A: more oxygen removed/ product is a solid/ gas syringe measures volume more accurately...
B: candle flame will not use all oxygen/ product is a gas/ graduated cylinder not as accurate as gas syringe/ more water vapour in the air/ volumes at different pressures... (6) [6]
- (b) (i) Show second column of table shaded/ clearly labelled (3) [3]
- (ii) Name **any one from:** beryllium/ magnesium/ calcium/ strontium/ barium/ radium (3) [3]
[symbols get no marks]
- (c) Give **any one from:** change of colour/ becomes flakey/ change of texture/ becomes softer/ loses strength/ tarnish/ rust (3) [3]

Describe



- nail/s in (i) (3)
- nail/s in (ii) (3)
- (i) calcium chloride/ drying agent **labelled/ clearly named in text** (3)
- (ii) boiled (de-gassed) water/ water with no air **labelled/ clearly named in text** (3)
- oil **labelled/ clearly named in text** (3) [15]
- stoppers **not required**
- [no diagram/s deduct 3 or 6 marks]**

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) **weight:** is a force/ depends on location (gravity)/pull of gravity/ (3)
mass: amount of matter/ resistance to force/ independent of location (gravity) (3)
allow (6) for 'weight = mass × g' **or** $w = mg$ [6]
accept 10 for 'g' in the formula above
- (b) sound (3)
 reflected/ bounced (3) [6]
- (c) **calculate work:** 3600 (3)
calculate average power: 240 (3) [6]
no marks for formulae or units
apply mathematical 'slip' and consequential marking here
- (d) bending of light (3)
any one from rod partly in water appears bent/ water appears to be shallower than it really is/ formation of an image by a lens/ rainbow/ mirage... (3) [6]
- (e) measure (degree) of hotness/ coldness (3)
 Celsius (Centigrade) ($^{\circ}\text{C}$) / Kelvin (K) / Fahrenheit ($^{\circ}\text{F}$) (3) [6]
- (f) fuse melts/ breaks/ blows/ excess current (3)
 breaks the circuit/ cutting off supply (3)
allow (6) for prevents overload (excess current)/ limits current [6]
- (g) conduction (3)
any one from: particles of liquid move carrying the heat with them/ current/ hot liquids rise/ cold liquids fall/ particles of a solid do not move around/ heat is transferred from one particle to another in a solid (3) [6]
- (h) **A:** LED glows (3)
B: LED does not glow (3)
 current changes direction/ LEDs are dim as they only pass half the current (current passes for only half the time)/ diodes in both circuits are forward biased half (some) of the time (4) [10]

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

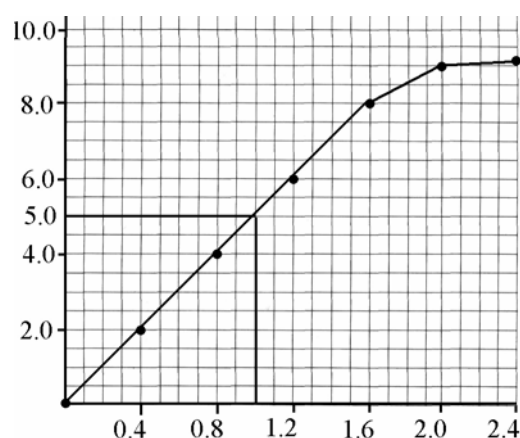
- (a) (i) Why? When drivers look in their mirrors they see 'Ambulance' (3) [3]
- (ii) Did? image A (3)
Give Double reflection (6) [9]
- (b) Describe **show or state:**
fill a bottle with water (3)
put the bottle in a freezer (3)
the bottle bursts (3)
or
ice (3)
floats (3)
lower density/ some above the surface (3) [9]
note: diagram is optional
accept equivalent experiments
- (c) (i) What? freezing/ solidifying/ changing from a liquid to a solid (3) [3]
- (ii) What? latent/ heat of fusion (3) [3]
- (d) (i) List **any two from:** CO₂ production/ global warming (greenhouse effect) / fines for not meeting agreed emission levels (Kyoto protocol)/ electricity shortages / possibly insecure supplies/ acidification of oceans/ non-renewable/ rising fuel (electricity) costs/ carbon tax... (2 × 3) [6]
- (ii) Suggest **any two from:** biomass/ nuclear/ geothermal/ solar/ tidal/ wave/ wind/ hydroelectric (2 × 3) [6]

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

- (a) State extension (increase in length) (3)
 depends directly on force applied (3)
or
allow (6) for $\frac{\text{force}}{\text{extension}} = \text{a constant}$ [6]

allow (3) for $\frac{f}{e} = k$

(i) Plot



- appropriate scales on both axes (3)
 points plotted must include the origin and the last three points (3)
 line drawn (3) [9]
note: for the sake of clarity a simplified grid is used in this marking scheme

- (ii) Use 1.0 N (accept range 0.9 to 1.1) (3)
 value indicated, clearly, on graph merits (3) [3]
[no graph no marks]

- (iii) Estimate 1.6 N (accept range 1.6 to 2.0) (3)
 value indicated, clearly, on graph merits (3) [3]
[no graph no marks]

- (b) (i) State parallel (3)
Give safety/ if one blows the other stays on/ both bulbs have full brightness (current) (brightness) (voltage)/ if they were in series both would go out/ two separate paths (circuits) (3) [6]

- (ii) What? series (3)
Explain circuit is broken (3) [6]

- (iii) Calculate 2.4 (3)
What? Ohm/ Ω (3) [6]
apply mathematical 'slip' and consequential marking here