

Biology (130 MARKS)

Question 1 (52)

- (a)(i) respiration (3)
- (ii) reproduction (3)
- (b)(i) limewater / calcium hydroxide / Ca(OH)_2 (3)
- (ii) water (3)
- (c)(i) tearing (ripping / gripping) (3)
- (ii) biting (cutting / chopping) (3)
- (d) Red blood cells: carry oxygen (O_2 / O) (3)
- Plasma: carries blood cells (minerals / nutrients / hormones / enzymes / antibodies / carbon dioxide (CO_2)/ heat / any valid substance) / regulates body temperature / maintains blood pressure (3)
- (e)(i) bacteria / fungi / virus (3)
- (ii) to supply food (nutrition) / growth medium / supply conditions for growth / helps them to grow (3)
- (f) Digestion: break down of food (3)
- Excretion: removal of waste / removal of valid names waste (3)
- (g) carbon dioxide (3)
- oxygen (3)
- (h)(i) X = testis / testes / testicle (3)
- Y = sperm duct / vas deferens (3)
- (ii) sperm (2)
- (iii) urethra (2)

Question 2

(39)

(a)(i) axes correctly labelled

correct scale

correct plot of 8 points

(3 × 3)

[slip -1 for each incorrect point, max of 3]

(ii) lack of sunlight (water / nutrients) / trampling

(3)

(iii) quadrat / belt transect

(3)

(b)(i) most suitable temperature / body temperature

(3)

(ii) iodine

(3)

(iii) X = yellow brown / red brown

(3)

Y = blue black

(3)

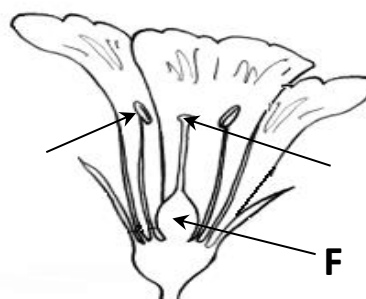
(iv) maltose

(3)

(c)(i) stamen / anther / pollen grain

(3)

(ii) **F** on / near arrow of ovary (3)



(iii) seed (fruit) development (formation / production) / seed dispersal

(3)

Question 3 (39)

(a) **State or show** (3 × 3)

[Marks awarded in the context of a valid experiment.]

Container of water with thermometer / temperature sensor

Burn food

Result: water heats up

Relevant labelled diagram

[Diagram must have at least one label – no labelled diagram – deduct [3] marks]

(b)(i) heart / lungs (3)

(ii) muscles (named muscle(s)) // pull on bones / contracts (2 × 3)

(iii) calcium / magnesium (3)

(c) (i) **X** in the lens / arrow indicating location of **X** (3)

(ii) iris (3)

(iii) tick under left eye (3)

(iv) brain and spinal cord (3)

(v) **Sensory**: carries message to CNS (brain / spinal cord) / carries message from sense organ (3)

Motor: carries message from CNS (brain / spinal cord) / carries message to muscle (gland) (3)

Chemistry (130 MARKS)

Question 4 (52)

(a) water // iron sulfide (2 × 3)

(b)(i) liquid (3)

(ii) changing of liquid to gas (vapour) (3)

(c)(i) Nitrogen (N_2 / N) (3)

(ii) copper sulfate ($CuSO_4$) / cobalt chloride ($CoCl_2$) (3)

(d)(i) strong / won't burn (melt) (3)

(ii) galvanising / painting (3)

(e) In any order:
sodium hydroxide (3)

hydrogen (3)

(f)(i) good conductor / ductile (3)

(ii) unreactive / malleable / lustrous / ductile (3)

(g)(i) coal / oil / peat / named oil product [do not accept wood] (3)

(ii) carbon dioxide / water (3)

(h)(i) proton (3)

(ii) electron (3)

(iii) nucleus (2)

(iv) nitrogen / N (2)

Question 5

(39)

(a)(i) **State or show**

(3 × 3)

[Marks awarded in the context of a valid experiment.]

Container with solvent

Ink spot on paper above solvent

Result: ink spot rises and colours
separate

[Diagram is optional]

(b)(i) distillation

(3)

[accept “evaporation + condensation”]

(ii) condenser

(3)

(iii) condensation / gas (steam) to liquid (water)

(3)

(iv) A

(3)

(c)(i) indicator / named indicator

(3)

[do not accept universal indicator]

(ii) shows when neutralisation occurs (when enough acid has been added)

(3)

(iii) burette

(3)

(iv) 19.4 cm³

(3)

[accept “19.2 + 19.3 ÷ 2 = 19.25 cm³ “ or “19.25 cm³ “]

(v) repeat without indicator

(3)

evaporate off the water

(3)

Question 6**(39)**

- (a)(i) 2 atoms indicated, showing a 2, 6 arrangement of electrons (3)
overlap of outer energy levels with four electrons shared, two from each atom (3)

- (ii) force of attraction // magnesium (Mg) loses 2 electrons (3)
two oppositely charged ions // oxygen (O) gains 2 electrons (3)

- (iii) dip the electrodes into the solution (3)
the bulb would light (3)

- (b)(i) relights a glowing splint (3)
(ii) to help current (electricity) to flow / acts as a catalyst (3)

- (c) (i) $2 \text{HCl} + \text{CaCO}_3 \longrightarrow$ (3)
 $\text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$ (3)

(ii)

Tested with:	Moist blue litmus	Moist red litmus
Final colour:	RED	RED

(2 × 3)

acidic (3)

Physics (130 MARKS)

Question 7 (52)

- (a)(i) water rises up the tube / water is sucked up (3)
(ii) gas contracts / partial vacuum created (3)
- (b)(i) no (3)
(ii) travelling in a different direction / velocity is speed in a given direction (3)
- (c)(i) blue (3)
(ii) breaks (melts / blows) when current (electricity / voltage) is too high / limits size of current flowing / safety (3)
- (d)(i) liquid (water) to gas (steam) / evaporation (3)
(ii) latent (3)
- (e)(i) Earth has a magnetic field / pole(s) of magnet attracted to the pole(s) of Earth (3)
(ii) they repel each other (3)
- (f)(i) 4 cm (3)
(ii) extension is proportional to weight added (3)
- (g)(i) better tyre grip / road holding / slows car / needed for braking (3)
(ii) wears (damages) the tyres / tyres get hot (3)
- (h)(i) $2400 \times 10 = 24000$ (3)
[accept calculation done using 9.8 m s^{-2} as acceleration due to gravity]
(ii) Newton / N (3)
(iii) $F \div A / 24000 \div 0.8$ (2)
 $30000 \text{ N m}^{-2} / \text{Pa}$ (2)

Question 8 (39)

(a)(i) ability to do work (3)

(ii) provides energy for plants to make food (photosynthesis) / provides heat *or* light (3)

(iii) radiation / rays (3)

(iv) reflects light from the sun (3)

(v) risk of explosion (harmful radiation / radioactive waste) / difficult to control / can be expensive / non-renewable (3)

(b)(i) B (3)

(ii) the apple (object) blocks the light (3)

(c)(i) sound of the bell becomes faint / can't hear the bell (3)

(ii) sound needs a medium to travel / sound will not travel through a vacuum (3)

(iii) light (3)

see lightning before hearing thunder / see flash from a starter pistol before hearing sound etc. (3)

(iv) Distance \div Time / $300 \div 0.2$ / $150 \div 0.1$ (3)

1500 m s^{-1} (3)

[$150 \div 0.2 = 750$ is awarded 3, 0]

Question 9**(39)**

(a)(i) five points correctly plotted

(5 × 1)

straight line through points

(4)

(ii) proportional

(3)

(iii) $V \div I$ / voltage from graph or table \div current from graph or table

(3)

Range: 0.5 to 0.6 Ω / correct answer from student graph

(3)

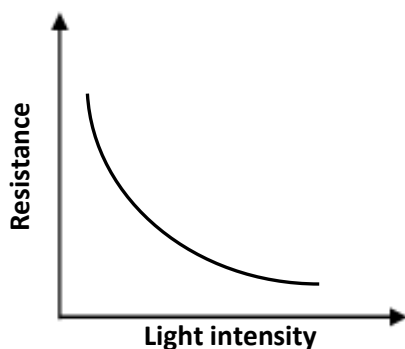
(iv) it gets hot / resistance rises / current decreases

(3)

(b) (i) move the lamp / reduce the brightness / change the bulb

(3)

(ii)

(3)

(iii) light (security) sensor / turning on (off) street lighting

(3)

(c) (i) A

(3)

(ii) forward biased / current flows

(3)

(iii) uses less current (energy) / cheaper / more efficient

(3)