Biology (130 MARKS)

Question 1 (52)

(*a*)(*i*) nucleus (3)

(*ii*) carbon dioxide (CO_2) // oxygen (O_2) // water (H_2O) // hormones // (named) product of respiration/digestion/excretion (3)

(*b*)(*i*) xylem / phloem / vascular // dermal // ground (3)

(*ii*) transport // protection // storage / photosynthesis (3)

(*c*)(*i*) geotropism / gravitropism (3)

(*ii*) helps (root) get water/minerals // helps anchorage (3)

(*d*)(*i*) time during which fertilisation/pregnancy can occur (3)

(*ii*) days 1 – 5 ± 2 (3)

(*e*)(*i*) 37 ± 1 (3)

(*ii*) respiration (3)

(*f*) Y: oxygen / O_2 (3)

capillary (3)

(*g*) Any two of:

salt // urea // water // sweat (perspiration) (2 × 3)

(*h*)(*i*) 23

(*ii*) genes

(*iii*) freckles // eye colour // hair colour // any valid trait

(*iv*) DNA (deoxyribonucleic acid)

protein **(6 + 4 × 1)**

Question 2 (39)

(*a*) (named) sugar (3)
fibre / roughage / cellulose (3)
(in any order)

(*b*)(*i*) energy (3)

(*ii*) (biological/protein) catalyst // speeds up (biological) reaction (3)

(*iii*) (salivary) amylase (3)

(*iv*) maltose (3)

(*v*) mouth (3)
small intestine (3)
(in any order)

(*c*)(*i*) so as to see colour change (3)

(*ii*) (named) alcohol (3)

(*iii*) **Award marks for any 3 of 5 points:** (3 × 3)

Remove from liquid X / alcohol
Dip in boiling (hot) water / water bath
Add iodine
Place it on a white surface / tile / clock glass
Result: colour change to blue / black / purple

Question 3 (39)

(*a*)(*i*) interdependence (3)

(*ii*) provide food (nectar/pollen) // provide shelter (habitat) (3)

(*iii*) pollination (3)

(*iv*) fewer apples caused by less pollination (3)

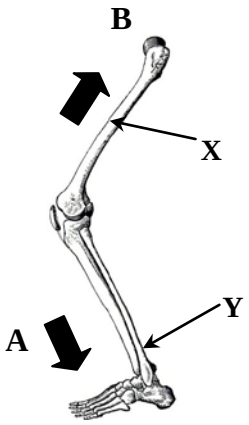
(*b*)(*i*) iris (3)

(*ii*) **A** (3)

(pupil enlarges/dilates) to allow more light into eye (3)

(*c*) (*i*) **X** femur / thigh bone (3)

Y fibula (3)



(*ii*) letter **B** at upper region of thigh bone (3)

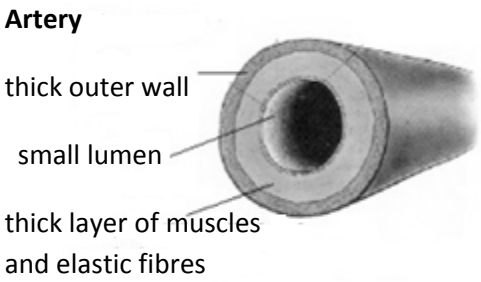
(*iii*) **A** near arrow going downwards (3)

(*iv*) **State *or* show** (2 × 3)

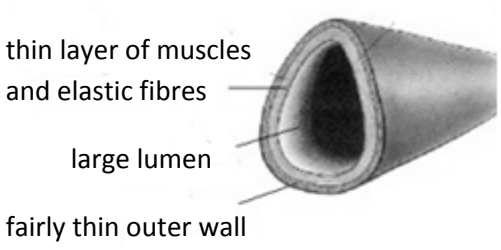
Any two of:

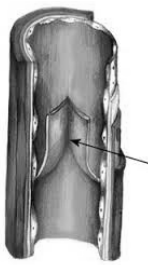
arteries have a thick wall (of muscle) / veins have a thin wall (of muscle) //
arteries have a small lumen / veins have a larger lumen //
arteries have no valves / veins have valves
veins have valves, arteries do not have valves

Artery



Vein





Chemistry (130 MARKS)

Question 4 (52)

(*a*)(*i*) methane / CH_4 (3)

(*ii*) water (vapour) / H_2O (3)

(*b*)(*i*) 2 molecules/moles (of hydrogen peroxide (H_2O_2) present) (3)

(*ii*) 2 atoms of oxygen (present in hydrogen peroxide (H_2O_2)) (3)

(*c*)(*i*) gases can be compressed / squashed / change volume (3)

(*ii*) water cannot be compressed / squashed / change volume (3)

(*d*) Any two of:
oiling // greasing // plastic coating // galvanising // electroplating // painting (2 × 3)

(*e*) $CaCO_3 + 2HCl \longrightarrow CO_2 + H_2O + CaCl_2$ **(6 × 1)**

(*f*) (*i*) ionic (3)

(*ii*) blue (3)

(*g*)(*i*) hydrogen / H_2 (3)

(*ii*) copper // mercury // silver //gold // lead // tin // iron // any valid metal (3)

(*h*)(*i*) neutralisation

(*ii*) salt

water

(in any order)

(*iii*) burette not filled below the tap // tap of burette is open // should have used a conical flask instead of a beaker // no white tile // no stand / clamp

(6, 2, 1, 1)

Question 5 (39)

(*a*)(*i*) screening (3)

litter // plastics // sticks // any valid debris (3)

(*ii*) water at the top is clean // solids have settled to the bottom (3)

(*iii*) to remove suspended (small / insoluble) solids (particles) (3)

(*iv*) chlorine / Cl_2 (3)

(*v*) fluoridation / adding fluoride // pH adjustment (3)

(*vi*) water is safe/suitable to drink // water is free from micro-organisms (bacteria) // prevents disease // healthy (helps) teeth (3)

(*vii*) water expands (when it freezes) (3)

(*b*)(*i*) calcium // magnesium (3)

(*ii*) ion exchange // deionisation // boiling // bath salts // washing soda // distillation (3)

(*c*)(*i*) hydrogen / H_2

(*ii*) carbon // graphite // platinum // gold // rhodium

(*iii*) sulfuric acid / H_2SO_4 // sodium sulfate / Na_2SO_4

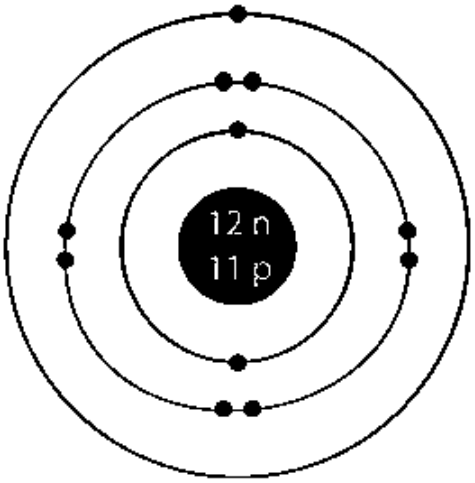
(6, 2, 1)

Question 6 (39)

(*a*)(*i*) Alkali metals (3)

(*ii*) correct location of neutrons and protons (3)
2 electrons in first shell (3)
8 electrons in second shell (3)
1 electron in third shell (3)

[No diagram – no marks]



(*b*)(*i*) same number of electrons on the outer shell (3)

(*ii*) hydrogen & potassium hydroxide (3)

(*c*) **Award 6 marks for first correct answer in (c)**

(*i*) oxygen / O_2 (3)

(*ii*) nitrogen / N_2 (3)

(*iii*) **State *or* show**

limewater (3)

turns milky (3)

(*iv*) composition of air changes (depending on location / weather) // % carbon dioxide composition changes (from inhaled to exhaled) // % water vapour composition changes (depending on the weather) // (if air is cooled) the different gases can be separated (3)

Physics (130 MARKS)

Question 7 (52)

(*a*)(*i*) dispersion (3)

(*ii*) prism // diffraction grating (3)

(*b*) added to (3)

energy needs to be added to break the forces (in the ice to form water) // correct reference to latent heat (3)

(*c*) resistance increases // the current flowing decreases **(6)**

(*d*)(*i*) $V = \pi r^2 h$

$\frac{22}{7} \times 4 \times 7$ // $\pi \times 4 \times 7$ // $3.14 \times 4 \times 7$ [Incomplete calculation – Slip -1]

88 cm^3 // 28π cm^3 // 87.92 cm^3 (3)

(*ii*) $D = M \div V$

$\frac{66}{88}$ g/cm^3 // $66 \div$ answer from (*i*) above [Incomplete calculation – Slip -1]

0.75 g/cm^3 // $2.357 \div \pi$ g/cm^3 // 0.7507 g/cm^3 (3)

(*e*)(i) solids (road) expand(s) (3)

(*ii*) radiation (3)

(*f*) 1.8×30 // 54 **(2)**

distance = $1.8 \times 30 \div 2.7$ // Answer from line 1 $\div$ 2.7 // 20 cm **(2)**

70 cm mark // Answer from line 2 added to 50 **(2)**

(*g*) lower boiling point // due to lower pressure (at higher altitude) **(6)**

(*h*)(*i*) non-renewable

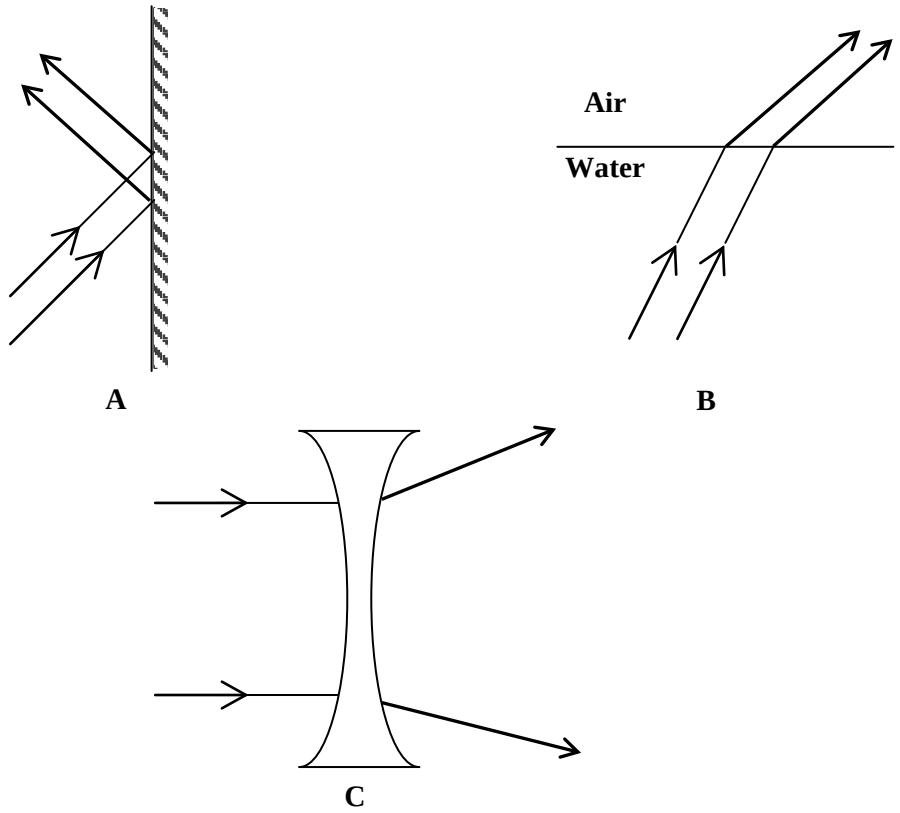
(fuel) is used up // cannot be reused // a different atom each time

(*ii*) very efficient fuel // lots of energy released from a small amount of fuel // less carbon emissions // reducing use of fossil fuels

(6, 2, 2)

Question 8 (39)

(*a*) correct rays for diagrams A, B and C (3 × 3)



refraction (3)

(*b*) reference to gas / gap / vacuum (3)

reference to insulator / insulation // poor conductor (3)

(*c*)(*i*) 15 m/s (3)

(*ii*) distance = speed × time // any correct formula (substituted formula) // 10 × 60 (3)

600 m (3)

Correct answer on its own – Award 6 marks

(*iii*) $a = \frac{v_2 - v_1}{t}$ // (15 – 10) ÷ 40 (3)

0.125 // $\frac{22}{7}$ (3)

Correct answer on its own – Award 6 marks

(iv) m/s/s // ms^{-2} // m/s^2 (3)

(v) decelerating // negative acceleration // slowing down // coming to a stop (3)

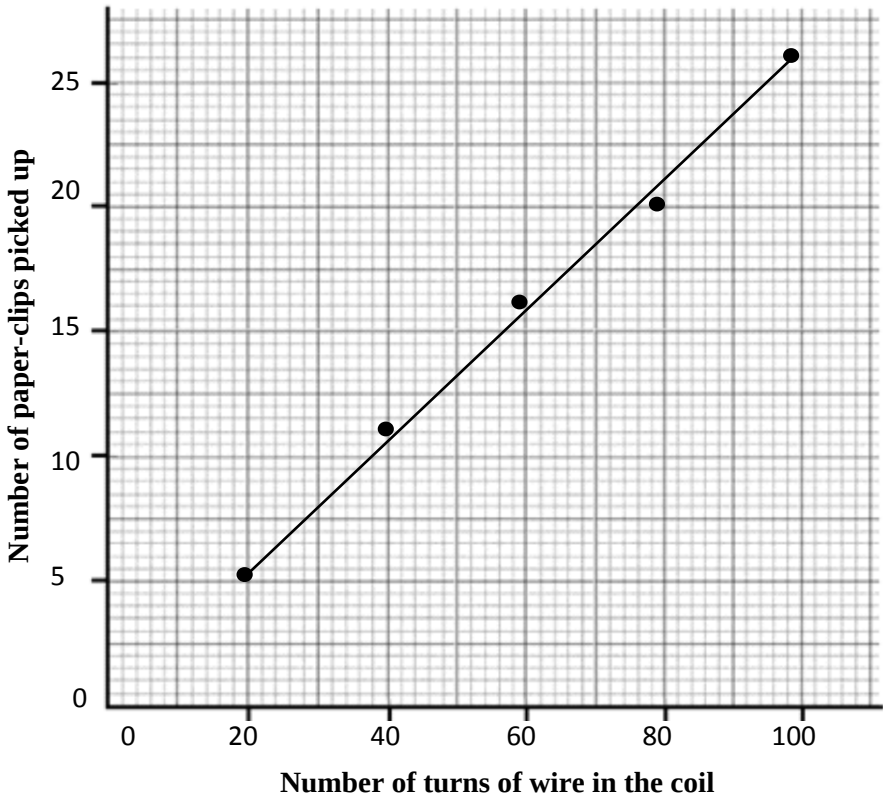
Question 9 (39)

(*a*)(*i*) iron // nickel // steel // cobalt (3)

(*ii*) ammeter (3)

(electric) current (3)

(*iii*)



five correctly plotted points (5 × 1)

line of best fit (4)

line from joining dots – Allow 2 marks

(*iv*) 8 // answer consistent with graph (3)

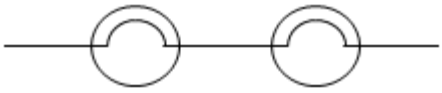
(*v*) same size/mass of paper clips // same magnet // same metal (bar) // same circuit // same type of wire // same laboratory conditions // same battery etc. (3)

(*b*)(*i*) current which flows in one direction (only) (3)

(*ii*) alternating current / a.c. (3)

(*iii*) electrical to chemical (3)

(*c*)(*i*) two bulbs in series (3)



(*ii*) two bulbs in parallel (3)