

Keep your hair on – it's only science

Get yourself familiar with the past papers and the past answers to clean up at the science exam

PAST PAPERS

If you are preparing for a written exam it is a good idea not just to study past papers but also to study past answers. It is also a good idea to be familiar with the most common mistakes so that you can avoid them. Remember that sometimes there is a single correct answer, other times any one of a number of answers is acceptable. Remember, you must do all questions but you can do them in any order you like.

Now here is a very useful exercise. Open the Junior Certificate Higher Level Science Paper 2006. Place it alongside this article. Note the following answers with explanation and comment where appropriate.

Biology

Question one

- (a) Humerus.
Hinge (synovial was also accepted).
(b) Bacteria and fungi (several others were accepted).
(c) Transpiration.

- Blue cobalt chloride paper turns pink/ boils at 1,000C.
(d) Remember what a control is. Draw a diagram identical to the one given except that air is sucked out through the side tube.
(e) Ovulation or egg released. It thickens. (Many students confused this with menstruation.)
(f) Chromosomes.

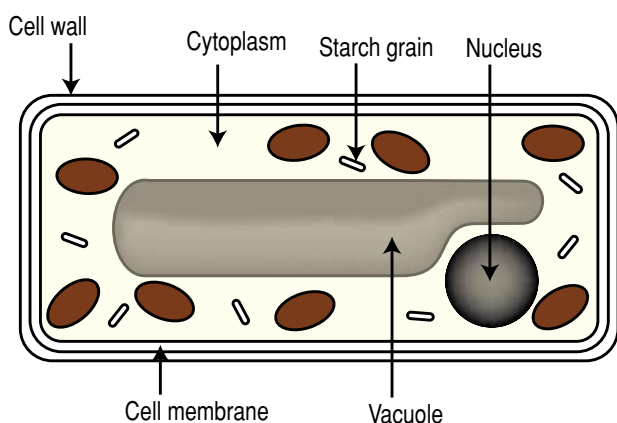
- DNA (Many students put down protein).
(g) Recycling. Waste material is reused. Recycling plants necessary. Obviously, you could have chosen composting, incineration or landfill.
(h) Uncovered area produced starch, the covered area did not. Light is necessary for photosynthesis. (Very few students distinguished between what happened to the uncovered and the covered parts of the leaf.)

Question two

- (a) (i) Alveoli/air sac.
(ii) Carbon dioxide from the blood enters the air sac and is breathed out. Oxygen, which is breathed in to the air sac, enters the blood.
(b) (i) Red corpuscles/white cells/platelets.
(ii) Carry oxygen/fight infection/clot the blood.
(iii) It pumps blood around the body. (The right side only pumps blood to the lungs.)
(c) (i) The heart beat/the heart pumping blood.
(ii) Count the number of beats per minute.
(iii) Rise. The heart beats faster to provide more oxygen (and get rid of more carbon dioxide).
Fall. Less oxygen needed. (Less carbon dioxide to remove.)

Question three

- (a) (i) Protein. Growth and repair. Carbohydrate. Energy. Fat. Slow release energy. Fibre. Prevents constipation.
(ii) Eat food from each layer but more from the bottom than from the top.
(iii) Cheese, meat or fish B. Crisps or chips A.
(b) (i) A. To magnify the image. B. To hold the slide.
(ii) Spread a thin piece of tissue flat on a slide, add a drop of iodine, cover carefully with a coverslip, and soak off excess stain. (Iodine makes it easier to see the nuclei of the cells.)
(iii)



Chemistry

Question four

- (a) Atoms of the same element with different numbers of neutrons or same atomic number but different atomic mass. (Many students did not know these definitions.)
(b) Hydrogen peroxide and manganese dioxide.
(c) Sulphur dioxide/SO₂
Erosion/dissolves/damages.
(d) Boil or evaporate all the water. Solids left.
(e) Same size pieces/same amount of acid/ same acid strength. Calcium, magnesium, zinc, copper. (Very badly answered.)
(f) 2,8,8,1. (Remember 2 in first, up to 8 in others)
(g) Ca(OH)₂ + CO₂ = CaCO₃ + H₂O
(h) Produces ions/improves conductivity/water poor conductor. Test. Burns with a "pop".
Two hydrogen to one oxygen/ formula H₂O.

Question five

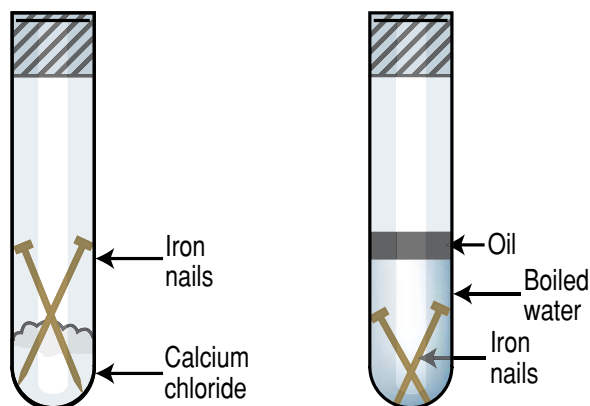
- (a) (i) A burette/B pipette
(ii) Set at zero and read volume at colour change.
(iii) Hydrochloric acid and sodium hydroxide.
(iv) HCl + NaOH = NaCl + H₂O (remember an acid and a base give a salt and water).
(b) A. Flexible/hardwearing etc B. Rigid.
(Common sense helped students to answer this.)

- (c) (i) Separates into different colours.
(ii) Ink moves up but no separation.

- (d) Gas. No fixed shape/takes volume of container.
Solid. Definite shape/definite volume.

Question six

- (a) (i) Gas expands on heating/to compare volumes at the same temperature.
(ii) Volume decreased until all oxygen removed. Then steady. (Many students didn't even attempt this.)
(iii) Nitrogen. (Surprisingly, many got this wrong.)
(iv) Candle will not use all the oxygen/syringe measures volume more accurately than graduated cylinder.
(b) (i) Shade and label second column from left.
(ii) Calcium/magnesium.
(c) Rust/change of colour, etc.



Nails in first tube do not corrode, no water. Nails in second tube do not corrode, no oxygen.
(Calcium chloride is commonly used to absorb water from the air. Boiling water drives air out, oil prevents it from getting back in.)
Most candidates fared very poorly in this question.

Physics

Question seven

- (a) Weight is a force pulling a body towards the centre of the earth.

Mass is the amount of matter in a body.

- (b) Sound is reflected.
(c) Work = force by distance = 600N x 6m = 3600J
Power = work/time = 3600J/15s = 240 Watts. (1 joule per second is 1 watt.)

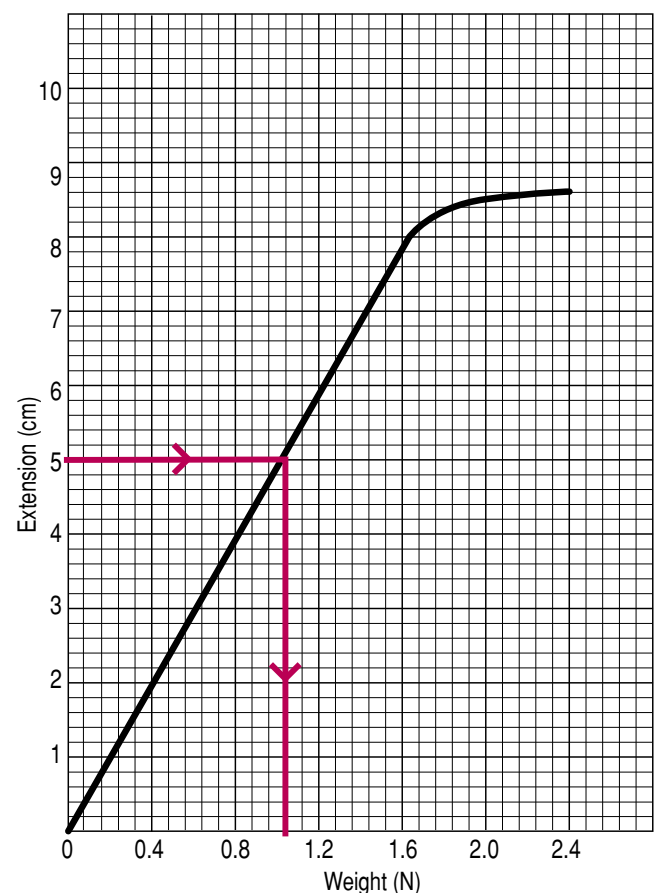
- (d) Refraction is the bending of light.
Formation of images by lenses/ water appears shallower than it is, etc.
(e) Degree of hotness. Unit: Degree Celsius.
(f) Fuse melts and breaks the circuit if current exceeds a set value.
(g) Conduction. Convection: Liquid particles move, carrying heat with them.
(h) A: LED lights. B: LED doesn't light.
Each diode is only in forward bias half the time.

Question eight

- (a) (i) When drivers in front look in the rear view mirror they see ambulance.
(ii) Image A. Double reflection reverses image and turns it back again.
(b) Fill a bottle to the very top with water. Put the cap on tight and put it in the freezer. The bottle bursts.
(c) (i) It froze/solidified/changed from liquid to solid.
(ii) Latent heat/ heat of fusion.
(d) (i) Non renewable/ global warming/supply uncertain, etc.
(ii) Hydroelectric/solar/wind/nuclear, etc.

Question nine

- (a) The extension of a spring is directly proportional to the force stretching it.
(i)



- (ii) 1 Newton.
(iii) 1.6 Newton.
(b) (i) In parallel. Reason: If they are in series and one blows both go out.
(ii) In series. Explain: when one bulb blows the circuit is broken.
(iii) $R = V/I = 12/5 = 2.4$. Units: Ohms.