

Biology Practice Papers Answers

Paper 1

- 1.1 a** A - Cell wall; B - Cell membrane; C - Chloroplast; D - Nucleus.
- b** To absorb sunlight; for photosynthesis.
- c** Electron microscope.
- d** Magnification = $\times 100\,000 - 500\,000$; Resolution = $0.1 - 1\text{nm}$
- e** $25\,000\ \mu\text{m}/10\ \mu\text{m} = \times 2500$

1.2 a Differentiation

- b** Any *two* from: Has chloroplasts; Has a cellulose cell wall; Has a permanent vacuole.

1.3 a Cell cycle drawn as a circle in four segments; Segments are labelled clockwise from top; Mitosis/M, G1, S, G2.

- b** During the G1 phase, the sub-cellular structures/organelles are doubled; During the S phase, the genetic material / DNA is doubled; During the G2 phase, the chromosomes are checked for errors; During the M phase/mitosis, the chromosomes are separated into two daughter cells.

1.4 a i Number of cells in mitosis.

- ii** Root tip treatment.

- b** 3; 47.

- c i** The root tip treated with paclitaxel had fewer cells in mitosis than the cells not treated with paclitaxel; The cells treated with paclitaxel had a very low number of cells in mitosis.

- ii** Paclitaxel could inhibit/prevent mitosis.

- iii** To make the results more reliable.

- iv** Treat the root tip with different concentrations of paclitaxel; Treat a greater number of onion roots.

2.1 a $((5.0 - 4.4) \div 5.0) \times 100\% = 12\%$

- b** The water in the potato is more dilute than the water in the salt solution; so the water moves out of the potato cells and into the salt solution.

- c** The plasma/cell membrane comes away from the cell wall; The cell becomes plasmolysed.

- d** Use iodine solution.

2.2 a i C

- ii** Solution C contains sugar and protein; Milk contains lactose and milk proteins.

- b** Long term energy storage.

- c** Yes, because sucrose is a non-reducing sugar/does not give a positive test with Benedict's reagent.

- d** Use hydrochloric acid and heat to break the disaccharide; Neutralise, and add Benedict's reagent and heat.

- e** Carbohydrazase

- f** Starch \rightarrow glucose

2.3 a Pulmonary artery

- b** The lungs

- c** The blood is pumped from the heart to the lungs to be oxygenated; and then back through the heart to be pumped around the body.

- d** Double circulatory system

- e** Figure 2 labelled in the top half of the right atrium.

- f** There needs to be time for the ventricles to fill with blood; otherwise the ventricles will contract while empty.

2.4 a The heart/cardiac muscle will not receive enough oxygen; The person will have a heart attack.

- b** Stent/statins.

- c** Any *two* from: Diet; Smoking; Lack of exercise; Obesity.

3.1 a Any *three* from: Bacteria do not have a nucleus; Bacteria do not have organelles; The DNA in bacteria is a single loop in the cytoplasm; Bacteria have plasmids; Bacteria are smaller than eukaryotic cells.

- b** Antibiotics

3.2 a There were fewer incidences of tuberculosis in 2015 compared to 2010.

- b** A small amount of dead virus/antigen is introduced to the body; which triggers an immune response by the lymphocytes; The virus/antigen is remembered by memory cells if the same virus infects the body again.

- c** Not enough people have been vaccinated; Tuberculosis is easily spread by coughs and sneezes; Antibiotics might not be available for treatment of tuberculosis.

- d** There would be herd immunity; Enough people would be immune to tuberculosis so it could not easily spread through the population; People who were not vaccinated would be protected from infection with tuberculosis.

3.3 a Any *one* from: Paracetamol; Aspirin; Ibuprofen; Morphine; *any named painkiller*.

- b** In plants/microorganisms; Development of existing drugs.

- c** Preclinical testing tests new drug on cells in a laboratory; The new drug is tested for toxicity/efficacy/dose; If the drug is not toxic and effective it goes to clinical trials, where a very low dosage of the new drug is given to healthy volunteers and patients; If the drug is safe, it moves to further clinical

trials where different doses of the new drug are given to healthy volunteers and patients to find the optimum dose for the drug; The new drug then goes to wider clinical trials where the new drug is given to patients; The results of clinical trials are peer reviewed and published in scientific or medical journals.

4.1 a

Distance of lamp from pondweed (cm)	Volume of oxygen collected in 5 minutes (cm ³)	Rate of reaction (cm ³ /min)
0	15.0	3.0
20	12.5	2.5
40	6.5	1.3
60	6.0	1.2
80	6.0	1.2

- b** (cm) added to column header in first column; .0 added to 6 in column 2, row 4 (added to table above).

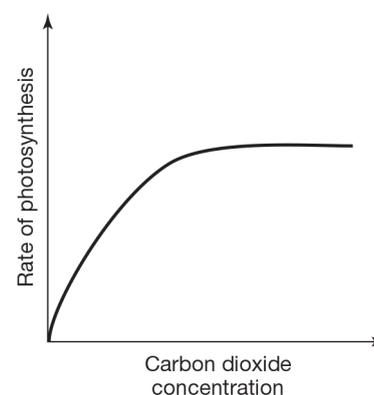
- c** Distance of the lamp from the pondweed.

- d** The volume of oxygen collected in 5 minutes.

- e** Any *two* from: Temperature; Other light sources; Type of plant; Size of plant.

- f** Repeat their investigation.

4.2 a



- b** As the carbon dioxide concentration increases, the rate of reaction increases; until a limiting factor prevents the rate of reaction increasing, and the rate of reaction remains constant.

- c** Line drawn onto graph that extends the original steep line; the rate becomes constant above the original line.

- d** The rate of reaction with increased carbon dioxide concentration remains constant at a certain point due to the limiting factor of light intensity; With an increased light intensity, the rate of reaction increases for longer, before another limiting factor causes the rate of reaction to remain constant.

Paper 2

- 1.1 a** Fast; automatic / involuntary reaction.
b Sensory neurone → relay neurone → motor neurone
c Any *one* from: Blinking; Iris constriction; Knee-jerk; Coughing; Yawning; Any named reflex.

- 1.2 a** A – Iris; B – Lens; C – Retina; D – Optic nerve.
b The iris constricts; and makes the pupil smaller.
c To bend the light into the eye so that the light focusses on the retina.
d Line shown going through the cornea, pupil, lens and finishing on the retina.
e Behind the retina.
f Convex lens.

- 1.3 a** A system of glands and organs; that produce hormones.
b Ovaries
c Any *two* from: Repairs the lining of the uterus after menstruation; Slows down the production of follicle-stimulating hormone so that only one ovum reaches full maturity; Stimulates the pituitary gland to release luteinising hormone.
d Intrauterine implant.

1.4 a

Type of contraception	Number of pregnancies per 1000	Percentage of pregnancies prevented (%)
Condoms	30	97.0
Spermicides	40	96.0
Contraceptive pill	1	99.9
Intrauterine device	2	99.8

- b** Contraceptive pill.
c *One* from: Follicle-stimulating hormone; luteinising hormone.
d IVF is a type of fertilisation that happens outside of the body; Eggs are surgically removed from the mother and fertilised by the father's sperm in a laboratory; The fertilised eggs develop into embryos and are

are then placed surgically into the woman's uterus.

- e** Advantage. *One* from: It allows the mother to give birth to her own baby; The baby will be the genetic offspring of the mother and father.
 Disadvantage. *One* from: The success rate is not high; It can lead to multiple births which is less safe for the mother and babies; Emotionally/physically stressful.

- 2.1 a** Y – deoxyribose/pentose sugar; Z – phosphate group
b C/cytosine; G /guanine
c Nucleus
d A short section of DNA; that codes for a particular protein.

- 2.2 a** Recessive: The phenotype is only expressed if there are no dominant alleles.
 Dominant: The phenotype is always expressed.

- b** i 3
 ii 1
 iii 25%
c i Tt
 ii 100%

- 2.3 a** Charles Darwin; Alfred Russel Wallace.
b Within any population there is **variation**; Some individuals have characteristics that are better **adapted** to the environment and are more likely to survive; These individuals are more likely to have **offspring** and pass on those characteristics.

- c** i All are segmented; all have two antennae.
 ii Helmetiids and tegopeltids.

- 2.4 a** Class – Amphibian; Genus – Bufo.

- b** Any *one* from: Frog, newt, salamander; any amphibian.
c The name contains the genus and species name; Binomial names prevent confusion when identifying species.

- 3.1 a** To add minerals to the soil; To keep the plants healthy.

- b** Any *two* from: Potassium; Phosphorus; Nitrogen.
c The carbon in the leaves is eaten by decomposers; Decomposers respire;

and breathe out carbon dioxide into the atmosphere; The carbon dioxide is taken up by the carrots for photosynthesis; Photosynthesis produces sugars; which are used in respiration by the plant to provide energy for growth.

- d** i The cold temperature prevents decomposers from replicating; and decomposing the food.
 ii The box may have been damp; There was plenty of oxygen.

- 3.2 a** A group of populations living and interacting with each other in the same area.

- b** Oak tree → caterpillars → blackbirds → sparrowhawk
c Caterpillars
d Oak tree
e Pyramid with bars drawn to scale for each species; from top to bottom: sparrowhawk, blackbird, caterpillars, oak tree.

- 3.3 a** A few days; To give the woodlice time to mingle with the population; To give the woodlice time to move around; To allow time for migration.

- b** i Dark and dry – $(80 \times 88) \div 40 = 176$;
 Light and dry – $(10 \times 7) \div 2 = 35$
 ii Woodlice prefer to live in dark and damp conditions.

- 3.4 a** From 1800 to 1930 the human population increases slowly, and after 1950, the human population increases steeply; From 1800 to 1930 the number of extinctions remained steady, but after 1930 the number of extinctions increases steeply.

- b** The industrial revolution used coal to fuel the trains and factories; which increases the amount of carbon dioxide in the atmosphere; This increases global warming; Global warming causes climate change; The industrial revolution increased the level of pollution in the air.