Answers

CHEMISTRY

Topic 1

1. C Sulfur is a non-metal whereas sodium, calcium and magnesium are all metals.

2. B Nitrogen is the most common gas (78%) in the air. Oxygen is the most common in the earth's crust existing as oxides and carbonates.

3. D Electrolysis is used to split up compounds into constituent elements.

4. A Alloys are mixtures because they have a variable composition.

5. B The ratio of hydrogen to oxygen must be 1:8 and the sum of these two elements must equal the mass of water.

6. C Calcium and sulfur combine to form the compound calcium sulfide.

7. D Solids, liquids and gases can all combine to form mixtures.

8. B Compounds can be broken down, often to release gases.

9. A Solute + Solvent = Solution

10. C Stirring and using a warm solvent would speed up dissolving.

11. C To test if a solution is saturated or not you would see if any more solute dissolves.

12. C This is the most soluble at 20°C.

13. B As the crystals are small (greater surface area) and we have a greater volume of solvent, they would dissolve first.

14. D In a homogenous solution all the properties would be the same throughout.

15. A This is the most concentrated solution as it has 120 g/dm^3.

16. Hydrogen burns in oxygen gas to produce water. Water is a new compound with new chemical and physical properties. Unlike the elements it is made from, both of which are gases, it is a colourless chemically reactive liquid. It is not explosive, unlike hydrogen, and certainly does not help substances to burn, unlike oxygen.

17. Copper is the best conductor of heat and therefore the wax holding the pins onto the rod melts quicker, thus, the time for the pins to fall is less. Steel is the second best conductor. Carbon and sulfur are very poor conductors of heat.

18.

Burning charcoal in air (oxygen)	Copper oxide
Decomposing limestone	Carbon dioxide
Sodium metal and water	Iron sulfate and copper
Heating copper in air (oxygen)	Calcium oxide and carbon dioxide
Iron and copper sulfate	Sodium hydroxide and hydrogen

19. P Compound, as it undergoes thermal decomposition into simpler compounds.
Q Compound, as it is formed when an element (pinkish brown copper) heated in oxygen. The compound is copper oxide.
R Element, as pinkish-brown copper.

20. (a) P (b) S
(c) A and C are insoluble in solvent Q.
(d) To the mixture of A and B add solvent Q. Stir thoroughly and B will dissolve. Filter to remove undissolved A (residue) and evaporate the filtrate to obtain B.

21. A solution is a homogenous mixture where the solute particles are evenly spread throughout the solvent. A suspension is a heterogenous mixture where particles are unevenly spread throughout the liquid. Accordingly Diagram A is the solution as the particles are evenly spread out and Diagram B is the suspension.

22. The larger the surface area the faster a substance will dissolve. This is because the solvent can get at the solute more easily if it is a fine powder rather than a large crystal. In the diagram, the smaller blocks (fine powder) in total have a much greater surface area than the single large block (large crystal).

Topic 2

1. B Evaporation is used to obtain a soluble solid from a solution.

2. C Purifying water by passing it through sand beds is filtration.

3. B Distillation involves evaporation and condensation.

4. B Separating a mixture of salt and sand involves dissolving, filtration and finally evaporating.

5. A Chromatography is used to test for illegal drugs at athletic meetings.

6. B Electrolysis is not a physical method of separation.

7. B Porcelain chips ensure smooth boiling when distilling a liquid.

8. A To purify sewage you need to filter and followed by the process of reverse osmosis.

9. (a) If the solvent level was above the spots of dyes then they would dissolve directly in the solvent and not in the solvent that is absorbed up the paper.

   (b) If the line was drawn in ink then the dyes in this ink would also separate and become part of the chromatogram.

   (c) (i) solution G
   (ii) solution E
   (iii) solution H

10. Stir the mixture thoroughly [2]

    Evaporate the solution slowly to dryness [7]

    Add water to the mixture [1]

    Collect the filtrate in the evaporating basin [5]

    Salt dissolves but the sand does not [3]

    Filter the mixture [4]

    Remove the crystals of salt [8]

    Put on a pair of safety goggles [6]

11. (a) Ground up ore has a larger surface area to react with the sulfuric acid.

    (b) Bubbles indicate that a gas (carbon dioxide) has been given off.

    (c) (i) insoluble sand and rock
    (ii) clear blue solution of copper sulfate

    (d) electricity

12. (a) Plastic floats on the water thus it can be scooped off the surface.

    (b) Aluminium separates from the other metals as it will be the last to reach the bottom as it sinks the slowest.

    (c) Iron is magnetic and can be separated from copper by magnetic separation.

    (d) Glass is a transparent material whereas aluminium objects are shiny (lustrous). Also glass is a poor conductor of heat and electricity. Aluminium is a good conductor of heat and electricity.

13. Add water to the mixture of sand and fertiliser and stir thoroughly. Filter to remove the undissolved sand and collect the filtrate in an evaporating basin. Evaporate the water to leave the soluble fertiliser.

14. Normally water passes through the semi-permeable membrane from the pure water side to the salt water side. However the extra pressure on the salt water side causes reverse osmosis whereby the water passes from the salt water side to the pure water side. This helps to change sea water into drinking water. The semi-permeable membrane removes all traces of bacteria, viruses, chemicals and dissolved minerals.

Topic 3

1. D It is a liquid as its melting point is below room temperature and its boiling point is above room temperature.

2. A The pressure increases with heating as the particles hit the walls of the container more often.

3. D Ice (solid) is less dense than water and therefore floats.

4. C Solid to liquid (*P*) is melting, solid to gas (*Q*) is sublimation and gas to liquid (*R*) is condensation.

5. C Solids have a fixed shape and volume, but liquids only have a fixed volume. Gases do not have a fixed shape or volume.

6. C After the particles have diffused there will be an equal number on both sides of the tap.

7. B Gases are more compressible than liquids as their particles are further apart.

8. C Particles are closest in a solid, like a crystal of sodium chloride (common salt).

9. A When water vapour condenses, the particles lose energy to the surroundings.

10 D A solid expands less than a gas on heating because solid particles are not free to move (vibrate about fixed positions).

11.

Gas particles are arranged further apart than liquid particles.	You can smell the scent of an air freshener throughout the house.
Different particles of different elements have different masses.	A railway line expands in hot weather.
Particles in a solid vibrate more on heating.	It is easier to squash an air-bag than it is a water-filled bag.
Gas particles spread out to fill the space available to them.	A gold bracelet is much heavier than an identical silver bracelet.

12 (least space) sheet of lead metal → liquid mercury → solution of salt water → steam → hydrogen gas (most space)

13. (a) mercury (b) carbon (c) mercury (d) aluminium

14

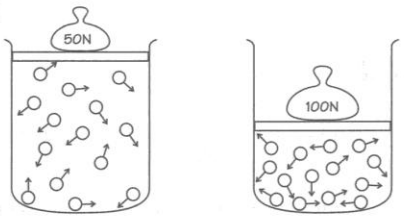


Diagram A Diagram B

Pressure is caused by the particles hitting the walls of the container. In diagram *B* there are the same number of particles but they are in a smaller volume. They would therefore hit the walls of the container more frequently, creating a larger pressure.

15. (a) These chemicals are volatile liquids with low boiling points. This means that their particles can easily change to a gas. Particles in gases move around more and spread naturally throughout the space available to them (diffusion).

(b) From the bathroom, diffusion would move the particles of perfume through the particles of air into the bedroom.

16. (a) (i) Blood vessels close to the skin warm the perfume up so that it evaporates and the pleasant smell travels through the air to other people.
(ii) The gas inside the aerosol can would greatly expand on heating and the particles would hit the sealed walls of the container at high speed causing the can to explode.

(b) (i) Insects are directed to flowers by the scent which the flowers give off. This scent is a vapour (gas) and travels by diffusion of its particles through the particles in the air.
(ii) Injured fish lose blood into the water which spreads by diffusion to the shark who then moves towards the injured fish being directed by the increased concentration of blood particles. The nose of a shark is extremely sensitive to such particles in the water.

Topic 4

1. A Atoms are extremely small, about 10,000 times smaller than a bacterium.

2. B Elements like aluminium contain only one type of atom.

3. B Aluminium has 13 protons and electrons (proton number) and 14 neutrons (mass number minus proton number).

4. B There are three different elements and eight atoms in total in ethanoic acid.

5. C A compound consists of different kinds of atoms chemically combined together.

6. C Carbon dioxide has three atoms (triatomic). O_3, H_2O and N_2O are triatomic as well.

7. C Proton number subtracted from mass number is the number of neutrons in the nucleus.

8. D The nucleus does not always contain equal numbers of protons and neutrons.

9. C Both these atoms have 30 neutrons (55-25 or 56-26).

10. A Four molecules of methane CH_4 contain 4 x 5 = 20 atoms.

11.

Positively-charged particle	Nucleus
Negatively-charged particle	Neutron
Small heavy central part of atom	Proton
Atomic particle with no charge	Electron

12. (a) HCl, Br_2, CO (diatomic)

(b) NO_2, Cl_2O (triatomic)

(c) PH_3, NCl_3 (tetratomic)

13. (a) CO, N_2O, CH_4 (two elements)

(b) CH_4, HNO_3 (five atoms)

(c) O_2 (not a compound)

(d) CH_4 (hydrocarbon)

(e) O_2 (essential for combustion)

(f) HNO_3 (nitric acid)

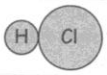
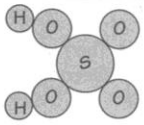
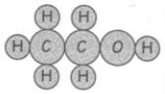
14. (a) sodium + **oxygen** → sodium oxide

(b) hydrogen + **oxygen** → water

(c) potassium + **chlorine** → potassium chloride

(d) **sulfur** + **oxygen** → sulfur dioxide

15.

Molecule	Chemical formula	Chemical name
	H_2	Hydrogen gas
	HCl	Hydrochloric acid
	CO_2	Carbon dioxide
	H_2SO_4	Sulfuric acid
	Cl_2	Chlorine gas
	C_2H_5OH	Ethanol

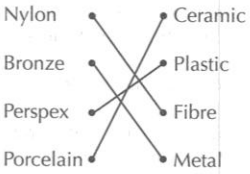
Assessment 1 Chemistry

1. C A saucepan is normally a metallic or ceramic object.
2. D Helium is a gas and polythene a light solid. Gold is denser than glass.
3. B Diamond, graphite and sulfur are non-metals.
4. C When sodium and chlorine react together they form sodium chloride.
5. B Common salt is the solute, water the solvent and salt water the solution.
6. A Water decomposes on electrolysis to form oxygen and hydrogen gases.
7. D I is the compound, II a mixture and III the element.
8. B Salt is soluble and pepper is insoluble. They can therefore be separated by adding water, stirring and then filtering.
9. A When a compound is formed a chemical reaction takes place.
10. A An acid (pH below 7) would react with marble chips to give off carbon dioxide gas.
11. C The temperature of a solvent affects the solubility of a particular solute.
12. B A saturated solution has as much dissolved solute as possible.
13. D Greater vibration of particles causes expansion.
14 B Respiration is oxidation of foodstuffs to form carbon dioxide and water.
15. C Acids do not feel soapy to touch (alkalis do).
16. B Bromine is a reddish-brown liquid at room temperature and pressure.
17. A Melting is a physical change and electrolysis a chemical change.
18. B Expansion is a physical not chemical change.
19. B Carbon monoxide is a poisonous gas produced by incomplete combustion of fuels.
20. C The reactants are sodium carbonate and sulfuric acid. The products are sodium sulfate, carbon dioxide and water.
21. D Cooling causes the particles to move more slowly.
22. A The electrical conductivity of a material is directly related to its thermal conductivity. Materials which are good heat conductors are also good electrical conductors.
23. A Liquids are made up of particles.
24. C Rusting changes iron to hydrated iron oxide which is a chemical change.
25. B Compressed air is still a gas so its particles are furthest apart.
26. A A chemical symbol represents one atom of an element.
27. B The melting point of X is below 10°C as it is a liquid at 10°C
28. C The average size of an atom is about a millionth of a millimetre.
29. C A hydrogen atom does not contain any neutrons in its nucleus.
30. B Hydrogen and oxygen are both present in these three molecules.
31. B Potassium contains 19 protons, 20 neutrons and 19 electrons.
32. B Thermal decomposition is the breakdown by heating of one molecule into two (or more) molecules. Thermal decomposition of carbonates to metal oxides and carbon dioxide gas is common.
33. A A compound must have atoms of different elements.
34. B Methanol has three elements (carbon, hydrogen and oxygen) and six atoms.
35. B An electron has the smallest mass.
36. A A diatomic molecule contains two atoms.
37. B If we subtract the proton number from the mass number we get the number of neutrons in the nucleus.
38. D The mass ratio between reactants and products remains the same in a chemical reaction. Total mass of reactants is always equal to the total mass of products.

39. D Carbon dioxide is the compound formed by the element carbon burning in air.

40. D Common salt (sodium chloride), water and chalk (calcium carbonate) are all compounds.

Section B

1. 

2. (a) (i) strong (tensile), malleable (easily shaped), smooth surface and easy to paint
(ii) good conductor of heat, transparent (see-through), very high melting point
(iii) drawn into fibre, strong (tensile), lightweight and waterproof

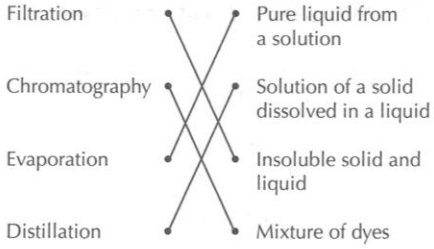
(b) (i) steel rusts
(ii) glass breaks easily (fragile)
(iii) nylon is non-biodegradable (not naturally decompose)

3. (a) (i) lithium, potassium and magnesium
(ii) carbon, sulfur and nitrogen
(b) (i) nitrogen and hydrogen
(ii) carbon and hydrogen (or nitrogen)

4.

Compound	Metal(s) present	Non-metal(s) present
Sodium carbonate	Sodium	Carbon, oxygen
Copper sulfate	Copper	Sulfur, oxygen
Calcium carbonate	Calcium	Carbon, oxygen
Zinc nitrate	Zinc	Nitrogen, oxygen

5. Acids turn universal indicator ***red*** while ***alkalis*** turn it blue. However in ***neutral*** solution the colour of the universal indicator remains the same. The pH value of the neutral solution is ***7*** . If the pH rises above the neutral value the solution is ***alkaline*** but if it falls below the neutral value the solution is ***acid*** . A strong acid would have a pH of ***1*** . A strong alkali would have a pH of ***14***. .

6. 

7. (a) A hydrogen B carbon dioxide
(b) B (carbon dioxide) is used in fire extinguishers.

8. (a) sodium + **oxygen** → sodium oxide

(b) **carbon** + oxygen → carbon monoxide

(c) sodium + **chlorine** → sodium chloride

(d) aluminium + chlorine → **aluminium chloride**

(e) iron + sulfur → **iron sulfide**

(f) **potassium** + **sulfur** → **potassium** sulfide

9. (a) Heating a solid causess it to expand as the particles vibrate more and move further apart.

(b) When a liquid freezes and becomes a solid its particles lose energy and become regularly arranged.

(c) A liquid evaporates as it warms up as the particles have more energy to escape.

10. (a) C (chlorine gas)

(b) E (magnesium chloride)

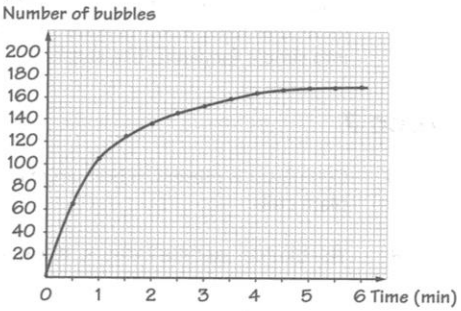
(c) D (mixture of magnesium and chlorine gas)

11. (a) Br_2 (element) (b) SO_2 (3 atoms) (c) SO_2 (sulfur dioxide) (d) MgO (base)

Section C

1 EITHER

(a)



(b) The speed was fastest at the beginning of the reaction. The reaction stopped after 5.5 minutes

OR

(a) hydrogen gas

(b) zinc sulfate (salt)

(c) zinc + sulfuric acid → zinc sulfate + hydrogen

(d) If zinc carbonate was used you will still see bubbles but carbon dioxide gas would be given off instead of hydrogen.

2. EITHER

Collect the broken glass and sugar in a container and add water. Stir thoroughly to make sure that all the sugar has dissolved up. Filter to remove the undissolved glass (caution as the broken glass can cut fingers). Collect the filtrate in an evaporating basin and evaporate most of the water so that the sugar crystallises out. (Draw labelled diagrams of filtration and evaporation)

OR

Make sure you start with the same mass of marble and granite. Add the same quantity of acid to both and time for the stone to disappear. The stone which dissolves the quickest wears away the fastest. The independent variable is the type of stone and the dependent variable is the time to dissolve. The controlled variables are the same mass of marble and granite and add the same quantity of acid (same strength) to both.

3. EITHER

(a) Least rusting occurs in neutral conditions (pH = 7) and at lower temperatures. Also if the iron metal is alloyed with chromium metal rusting is also reduced.

(b) To prevent rusting we must stop the oxygen and the water from the air from reaching the iron. This is achieved by coating the surface of the iron with oil/ grease or painting the surface or covering it with a layer of plastic. Also by plating the surface with a protective metal (zinc, silver, chromium etc.)

OR

Proton and neutron particles are found in the small central nucleus. Orbiting this nucleus are the electrons. Protons and neutrons have equal mass but electrons have negligible mass. Protons are positively charged, electrons negatively charged (equal numbers of protons and electrons in all atoms). Neutrons have no charge.
Boron has 5 protons (proton number) and therefore 5 electrons. However, it has 6 neutrons (mass number – proton number).

BIOLOGY
Topic 6

1. D Ferns have spore-producing structures on their leaves.

2. D Mosses and liverworts do not have true roots, stems or leaves but are found in moist, shady areas.

3. C Arthropods are a class of invertebrate animals.

4. B Birds and mammals are warm blooded vertebrates.

5. A Diamond is a form of carbon and has never been alive.

6. C A toadstool is a fungi but a bat is a mammal, an eel is a fish and a whale is a mammal.

7. B The largest group is a kingdom, then species, genus and the smallest is family.

8. B Changing wine into vinegar is not desired and is therefore caused by harmful bacteria.

9. D All of these are advantages of a biodiverse area.

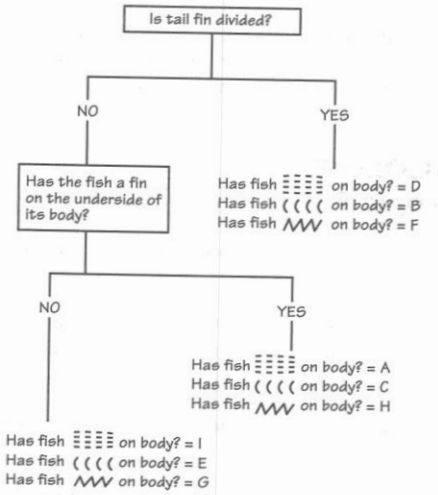
10. D Fungi are not part of the plant kingdom as they cannot photosynthesise.

11. A Wood Anenome
B Bluebell
C Primrose
D Wood Sorrel
E Bell Heather
F Lesser Celandine

12. Fish E, H Amphibian *A, F* Reptile *C, J*
Bird *C, B* Mammal *G, D*

13. Similarities Both cold-blooded and vertebrates.
Differences Amphibians lay their eggs in water whereas reptiles lay their eggs on land. Reptiles have dry scaly skin but amphibians have moist smooth skin.

14.



15. (a) Bat suckles its young as it is a mammal (rest are birds)

(b) Shark is a cold-blooded fish but the others are warm-blooded mammals.

(c) Leech is a worm and has no jointed legs. Beetles, ants and spiders are all arthropods with jointed legs and bodies.

16 (a) (i) No (ii) No (iii) No (iv) No

(b) Sea anemone catches its food using tentacles. All plants make their own food by photosynthesis. This involves using the energy from the Sun to change simple molecules like carbon dioxide and water into simple foodstuffs like sugars.

Topic 7

1. D Cytoplasm is present in both animal and plant cells.

2. B The bladder, not the kidneys, stores urine.

3. A These are the correct labels.

4. A There is no division of labour in a bacterium as it is a single cell.

5. B The magnification of the two lenses is 5 x 100 = 500x. Therefore, the nucleus would appear to be 500 x 0.01 mm = 5 mm.

6. B A partially permeable membrane allows some chemicals to pass through and not others.

7. D Chromosomes decide the genetic properties transferred from one generation to the next.

8. A The small spots in the cytoplasm of an animal cell are vacuoles.

9. A A lung is an organ because it is made of several tissues working together to perform a particular function.

10. B You should focus a microscope by moving the objective lens away from the microscope slide.

11. Chloroplast (contains the green pigment chlorophyll)
Cellulose (cell wall material)
Cytoplasm (protoplasm around the nucleus)
Chromosome (long coil of DNA)

12.

Cell	Cell membrane	Cell wall	Cyto-plasm	Single vacuole	Chlo-roplast	Chro-mosome
Leaf cell	✓	✓	✓	✓	✓	✓
Muscle cell	✓		✓			✓
Root cell	✓	✓	✓	✓		✓
Brain cell	✓		✓			✓
Red blood cell	✓		✓			

13. store room ..... vacuole
manager's office ..... nucleus
entrance doors ..... cell wall
shop floor ..... cytoplasm

14.

Sperm cell	Controls pores of stomata
Red blood cell	Carries nervous impulses
Epithelial cell	Carries oxygen to other cells
Egg cell	Carries male sex chromosome
Neurone cell	Absorbs water from soil in plants
Root hair cell	Covers inner surface of mouth and intestines
Guard cell	Carries female sex chromosomes

15. A. Muscle Cell: Such cells have to be able to stretch as the muscle expands and contracts.

B Sperm Cell: Such cells have to be able to 'swim' from the vagina to the oviducts, so being small and having a 'tail' helps them to do this.

C Ovum: Round so that it can travel from the ovaries down the oviduct. Also contains lots of stored nutrient material in its cytoplasm.

D Red Blood Cell: Biconcave shape allows the cell to carry oxygen molecules more effectively.

16. (a) Laila, Freya

(b) Leona (cell wall) Pamela (cell membrane)

(c) Chloe (chloroplasts) Leona (cell wall)

Topic 8

1. D Metals expanding is not explained by diffusion.

2. B The only correct statement is that osmosis occurs through the root hairs.

3. C The black dye molecules would spread themselves evenly through the water to give a uniformly grey solution.

4. B Oxygen diffuses from the air sacs of the lungs into the blood.

5. B Osmosis is movement of water from a solution of lower concentration to a solution of higher concentration.

6. B Plant cells do not burst because they have a cell wall made of rigid cellulose.

7. B Water moves from the soil via the root hair, to the root, to the xylem and finally to the leaf.

8. B Clotting of blood helps to seal up wounds and prevent blood loss.

9. D Mineral salts get in and out of plant cells by diffusion and active transport.

10. B The cell pigment (haemoglobin) carries the oxygen in the red blood cell.

11. A Animal cell membranes are elastic, thus, as osmosis occurs and the blood cell swells up, it will eventually burst.

12. B Digested food, carbon dioxide and waste material are carried by the plasma in the blood.

13. (a) Diffusion involves the movement of any molecule. [T]

(b) Diffusion is fastest in gases. [T]

(c) Osmosis is diffusion in reverse. [F]

(d) Osmosis helps to move sugars around in plants. [F]

(e) Diffusion can take place without a membrane. [T]

14 (a) Diffusion-natural movement of particles
Solvent-liquid which does the dissolving
Partially-permeable membrane allows only certain particles to pass through

(b) The cell shrinks in size as water is lost to the surroundings by osmosis.

15. The prune's skin is a partially-permeable membrane through which water passes from the outside inwards, which causes the prune to swell up.

16. A → H → G → B → C → F → E → D

17.

Comparison	Capillary	Artery	Vein
Blood direction	From arteries to veins	From heart	To heart
Blood pressure	Very low	High	Low
Internal diameter	Very narrow	Fairly wide	Fairly narrow
Wall structure	Single cell layer	Thick and elastic	Relatively thin

18. (a) Dissolved food travels from the intestines through blood vessels (capillaries, veins and arteries) to every living cell in the body. The heart is the pump which circulates the blood and the food dissolved in the plasma of the blood.

(b) Waste products travel from every living cell via blood vessels to the kidneys where the waste products are removed. Waste products dissolve in the plasma of the blood.

(c) Oxygen gas travels from the lungs to every living cell in the body via blood vessels. This gas is carried in the blood by the red blood cells.

Topic 10

1. A Muscular physique is not a hereditary characteristic.

2. A The correct labelling is option A.

3. B Fertilisation normally occurs in the oviduct.

4. A You only need one sperm to fertilise an egg.

5. B The union of sperm and egg is called fertilisation.

6. B Hormones are the chemicals responsible for puberty.

7. D The fertilized egg is called the **zygote** which rapidly divides to become the **embryo**. After 3 months of development it is called the **foetus**.

8. B Only gamete cells (ovum and sperm) transmit genetic information.

9. B The lack of signs or symptoms makes STIs very dangerous.

10. C The middle part of the menstrual cycle (11-17 days) is the fertile period when becoming pregnant becomes more likely.

11. D A contraceptive pill stops eggs from being released from the ovaries (ovulation).

12. A STIs cannot be prevented by using contraceptive pills.

13. A The deliberate ending of a pregnancy is called abortion.

14. A AIDS can be spread by abusing drugs and sharing needles.

15. B It is not acceptable to have an abortion just to avoid stopping work for career reasons.

Section B

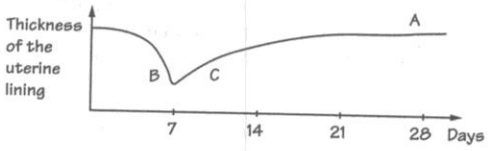
16.

Ovary	Muscular tube whose purpose is to hold the penis during copulation.
Uterus	Muscular tube between the ovaries and the uterus
Vagina	The entrance to the womb.
Oviduct	Female sex organ which is responsible for the production of eggs.
Cervix	Hollow muscular organ in which the fertilised egg develops.

17. (a) A sperm B ovum

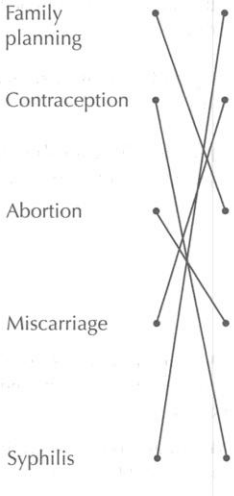
(b) cell A 1. Tail for 'swimming' towards the egg,
2. Pointed head to enter the egg easily
cell B 1. Round to help movement through the oviducts
2. Cell contains lots of food/ nutrient

18. (a)



(b) (i) C (ii) B

19.



20.

Contraception	
Temporary methods	**Permanent methods**
Condom	Ligation
Diaphragm	Vasectomy
Intra-uterine device	
Oral contraceptive	
Rhythm method	
Spermicide	

21. AIDS (***Acquired*** Immune Deficiency Syndrome) is caused by HIV (***Human*** Immunodeficiency Virus) which is ***acquired*** through the exchange of bodily fluids, often during ***sexual*** intercourse. This disease damages the ***immune*** system of the body by making the ***white*** cells of the body inactive and unable to fight disease. The body therefore becomes open to ***infection*** from bacteria and viruses and cannot 'defend itself'. At present, AIDS cannot be ***cured*** as there is no medication that can eliminate the virus from the body.

22. (a) Induced miscarriages are caused on purpose using drugs etc. to end a pregnancy. Spontaneous miscarriages are caused by the body itself telling the uterus to reject the embryo or foetus. The latter usually occurs when something has gone wrong with the pregnancy.

(b) Induced abortion is acceptable when the life of the mother is at risk. Also if the embryo/foetus is deformed or unlikely to survive. Another possible reason for an induced abortion is when the mother becomes pregnant from a rape incident.

Topic 11

1. D All the factors are physical (abiotic) factors.
2. B Human population has increased very rapidly over the last century.
3. A A community is different populations of organisms living in the same habitat.
4. B Producers are plants whereas consumers are usually animals.
5. B Organisms *P* and *Q* are both secondary consumers.
6. C *Q* and *S* both represent respiration in plants and animals.
7. B Decomposition is how nitrogen gas is returned to the air.
8. D A producer is eaten by the consumer and is the missing feeding relationship.
9. D All of these are essential for photosynthesis.
10. C Water is a reactant and oxygen is the product.
11. A Only algae can photosynthesise as it is a green plant with chlorophyll to absorb sunlight.
12. D Starch turns iodine solution dark blue.
13. B Chlorophyll does not supply oxygen for photosynthesis but absorbs the sunlight.
14. A Breathing is a physical process and respiration is a chemical process.
15. C Oxygen gas is released during the day and taken in at night.

Section B

16. (a) *Monkey* as it can climb trees and move through the *jungle* by swinging from tree to tree.

(b) *Camel* as it can go without water for long periods of time in the *desert*.

(c) *Whale* as the buoyancy of water in the *oceans* helps it to move its large body-mass much more easily.

17. (a) (i) M (ii) P (iii) L (iv) O

(b) ✓ increase in population of S (i), (iii), (v)
✗ decrease in population of S (ii), (iv), (vi)

18. (a) (i) spring (ii) summer

(b) (i) hawk (ii) field mouse

(c) An increase in the population of field mice causes an increase in the population of hawks, as more food is available. As the hawk's population rises they feed on more field mice, thus, the mice population starts to decrease and falls back to the original numbers. Less field mice means less food for the hawks thus their population returns to their original numbers. The cycle then repeats itself.

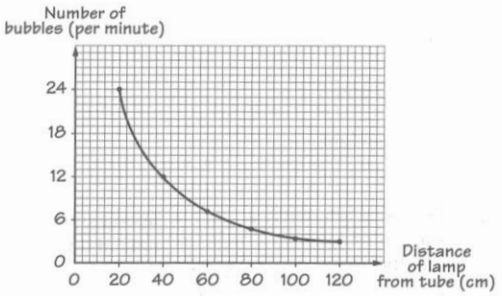
19. (a) 2.4 % (24,000 / 1,000,000 x 100)

(b) It is reflected back into the atmosphere.

(c) Lost as heat during respiration by the cow and also excreted as waste.

(d) The further down the food chain, the greater the loss of available energy. When feeding on grass there is more energy available than when feeding on meat.

20. (a)



(b) The further away the light is from the plant, the lower the light intensity. Light is needed for photosynthesis, thus, less photosynthesis takes place and fewer bubbles of oxygen gas are produced.

21. Light intensity is highest at around midday which explains the peaks at this time. The peaks vary in height according to how bright the day was. For example day 2 was a bright day (high peak) but day 3 was overcast (low peak).

22. Test tubes *A* and *B* are 'control' tubes to show that if there is no plant present then there is no colour change in the indicator. In test tube *C* the leaves photosynthesise and remove carbon dioxide gas from the solution making the indicator alkaline and purple. In test tube *D* (because of the black paper) only respiration can occur (no photosynthesis), which produces carbon dioxide making the indicator acidic and turning yellow.