

# ANSWERS

## CHAPTER 1 RESPIRATION

### 1.1 Human Breathing Mechanisms

- Nasal cavity  
Passage of air
  - Bronchus  
Tubes that lead into the lungs and divides into smaller tubes.
  - Bronchiole  
Tubes of small branches in the lungs
  - Lungs  
Organ that consists alveolus which is rich in network of blood capillaries.
  - Trachea  
Tube with C-shaped rings of cartilage
  - Intercostal muscle  
Relaxes and contracts during breathing mechanism
  - Ribs  
Protects the lungs
  - Diaphragm  
Controls the pressure in the lungs
- The balloons flatten
  - The balloons expand
- Lungs
    - Thoracic cavity
    - Trachea
  - Activity A  
Air pressure in the bell jar (thoracic cavity) increases and forces the air out of the lungs  
Activity B  
Air pressure in the bell jar (thoracic cavity) lowers and air is forced into the lungs.

3

(a)	Becomes larger	Becomes smaller
(b)	Decreases	Increases
(c)	Forced into of the lungs	Forced out of the lungs
(d)	Moves up and out	Moves down and in
(e)	Relaxes and moves upwards	Relaxes and curve upwards

### 1.2 Transport of Oxygen in the Humans Body

- Alveoli
  - higher
  - haemoglobin, oxyhaemoglobin
  - heart, lungs
  - whole body, Oxyhaemoglobin, oxygen
  - blood capillaries
    - lungs
- ✓ (c) ✓ (d) ✓
- Oxygenated blood
  - Deoxygenated blood

### 1.3 The Importance of a Healthy Respiratory System

- Pneumonia
  - Whooping cough
  - Emphysema
  - Lungs cancer
  - Bronchitis
- Tar – Causes lungs cancer  
Nicotine - Causes addiction to smoking  
Hydrocarbon – Causes cancer  
Haze - Causes breathing difficulties  
Carbon monoxide – Causes the content of oxygen in the blood to decrease
- ✓
  - ✓
  - ✓

#### ACTIVITY

Student's answer

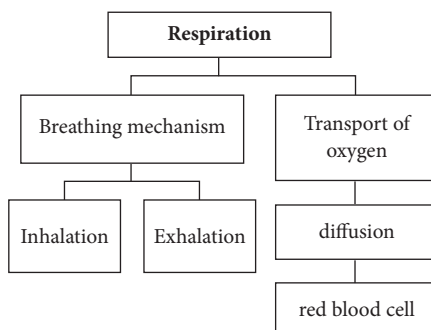
#### KBAT Corner

Slow blood flow allows more time for oxygen to be released from the red blood cells into the body cells. It also allows more time for waste products to diffuse from the body cells into the blood.

#### PISA/ TIMSS Corner

- ✓ He experiences breathing problem  
In order to inhale or exhale, the pressure inside the thoracic cavity must be lower or higher than the atmospheric pressure. If there is a hole in the chest wall, the pressure in the thoracic cavity will be the same as the atmospheric pressure and breathing cannot take place.

#### MEMORY BOOST



Properties of alveoli

- One-cell-thick wall
- Surrounded by blood capillaries
- Moist wall

Diseases

- Lung cancer
- Emphysema
- Asthma
- Bronchitis

Role of haemoglobin

To carry oxygen:

Oxyhaemoglobin

To release carbon dioxide: Oxygen

#### PT3 PRACTICE

- P : Lungs  
Q : Trachea
  - Diaphragm

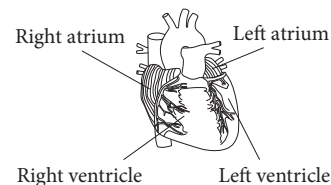
(i) In inhalation, X becomes flatten.	✓
(ii) In inhalation, X increases the volume of thoracic cavity.	✓

- Nose / Nasal cavity
    - Oxygen
    - Carbon dioxide
  - Diffusion
    - One-cell thick wall
  - Concentration of oxygen in the alveolus is higher than the concentration of oxygen in blood capillary.
  - The oxygen combines with haemoglobin in the red blood cells to form oxyhaemoglobin. Then, the blood flows to the heart where it is pumped to all other parts of the body.

## CHAPTER 2 BLOOD CIRCULATION AND TRANSPORT

### 2.1 Transport System in Humans

- Blood capillaries
  - To pump blood throughout the body
- 



- Pulmonary artery
    - Vena cava
    - Right atrium
    - Valve
    - Aorta
    - Pulmonary vein
    - Valve
    - Left ventricle
    - Right ventricle
- Receives oxygenated blood
  - Receives deoxygenated blood
  - Pumps oxygenated blood
  - Pumps deoxygenated blood
  - To ensure that blood flows in one direction

4

(a)	Vein	Artery	Capillary
(b)	Carries blood to the heart from all parts of the body	Carries blood from the heart to all parts of the body	Connects the artery and vein
(c)	Thin, less muscular, less elastic	Thick, muscular and elastic	One-cell-thick
(d)	Big	Small	Sederhana
(e)	Very low	High	Low
(f)	Present	Absent	Absent
(g)	Deoxygenated blood except the pulmonary vein	Oxygenated blood except the pulmonary artery	Carries oxygenated blood to the tissue and deoxygenated blood from the tissue

- 5 (a) deoxygenated, right atrium, right ventricle, right side of the heart  
 (b) oxygenated, left atrium, left ventricle, left side of the heart, body cells
- 6 (a) Glucose  
 (d) Amino acid  
 (e) kidneys  
 (f) Hormones
- 7 (a) Coronary heart disease  
 (b) Heart attack  
 (c) High blood pressure  
 (d) Stroke

## 2.2 Human Blood

- 1 (a) waste product  
 (b) Blood cell  
 (c) White blood cell  
 (d) Platelet
- 2 (a) – (i) (c) – (iv)  
 (b) – (iii) (d) – (ii)
- 3 (a) (i) Red blood cell  
 (ii) – Biconcave-disc  
 – Absent  
 (b) (i) White blood cell  
 (ii) – No definite shape  
 – Present  
 (c) (i) Platelets  
 (ii) – No definite shape  
 – Absent

4 (a)


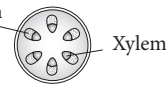

Can receive from	Can donate to
A, O	A, AB
B, O	B, AB
AB, A, B, O	AB
O	A, B, AB, O

- (b) Universal donor:  
 Group O  
 Universal recipient:  
 Group AB
- 5 (a) Surgery  
 (b) Complication during childbirth  
 (c) Serious road accident
- 6 (a) Compatibility  
 (b) Blood-transmitted diseases
- 7 (a) Hemophilia  
 (b) Anaemia  
 (c) Aids  
 (d) Hepatitis B

## ACTIVITY

Student's answer

## 2.3 Transport System in Plants

- 1 (a) Xylem  Phloem  
 (b) Phloem  Xylem  
 (c) Xylem  Phloem

- 2 (a) Xylem: To transport water from the roots to the other parts of plants.  
 (b) Phloem: To transport synthesised food from the leaves to the other parts of plants.
- 3 (a) evaporation, transpiration  
 (b) stomata  
 (c) Water vapour  
 (d) (i) water, dissolved minerals, roots  
 (ii) cool the plant
- 4 (a) Surrounding temperature, light intensity, air humidity, air movement

## KBAT Corner

Mass potometer is a more effective potometer. The unit used in a mass potometer is mass per unit of time. Mass is a right unit used to measure the amount of water. The unit used in a bubble potometer is length per unit of time. Length cannot be used to measure the amount of water; it needs to be multiplied with the area of cross section of the capillary tube in order to measure the volume of water.

## PISA/TIMSS Corner

- Thick and muscular walls  
 Able to withstand the high pressure of the blood pumped from the heart.

## MEMORY BOOST

- (a) Pulmonary circulation  
 (b) Systemic circulation  
 (c) Artery  
 (d) Vein  
 (e) Blood capillary  
 (f) To pump blood  
 (g) White blood cell  
 (h) Red blood cell  
 (i) Platelet  
 (j) Air movement  
 (k) Light intensity  
 (l) Humidity  
 (m) Surrounding temperature  
 (n) Transports water from the root to the other parts of plants  
 (o) Transports food from leaves to other parts of plants

## PT3 PRACTICE

- 1 (a) (i) Artery  
 (ii) Carries blood away from the heart to all parts of the body  
 (b) The individual will experience stroke or a heart disease  
 (c) The food is rich in fats that can cause the deposition of cholesterol to increase.
- 2 (a) (i) Right atrium  
 (ii) Left ventricle  
 (b) To pump blood to all parts of the body  
 (c) R and S
- 3 (a) To study the importance of phloem tissues to the plants  
 (b) Under the sunlight.  
 (c) Phloem  
 (d) Food substances  
 (e) Apply some paraffin oil at part X  
 (f) The upper part of X becomes swollen

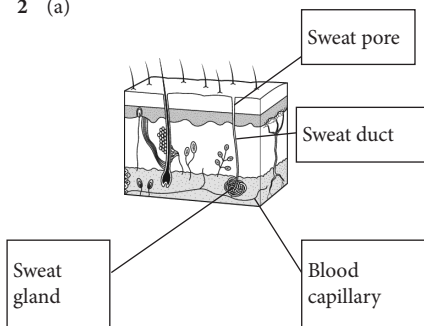
## CHAPTER 3 EXCRETION

### 3.1 Human Excretion

1

Label	Excretory organs	Excretory products	Process of elimination
P	Skin	Water, urea and mineral salts	Sweating
Q	Lungs	Water and carbon dioxide	Exhalation during respiration
R	Kidney	Water, urea and mineral salts	Urine

2 (a)



- (b) (i) - Collect waste products to produce sweat  
 (ii) - Allows sweat to pass through it  
 (iii) - Removes sweat out of the body  
 (iv) - Carries waste products to the skin
- 3 (a) Balances the water contents in the body.  
 (b) Control the regulation of blood concentration.  
 (c) Controls the regulation of the body temperature.

### 3.2 The Urinary System in Humans

- 1 (a) (i) Kidney  
 (ii) Urethra  
 (iii) Ureter  
 (iv) Urinary bladder
- (b) (i) Filters out waste products from the blood and regulates water and salts balance in the body.  
 (ii) Transports urine from the kidney to the bladder.  
 (iii) Channels urine from the urinary bladder to the exterior of the body during urination.  
 (iv) Stores urine temporarily before the urine is excreted.
- (c) (i) Ureter  
 (ii) Urethra
- 2 (a) (i) Cortex  
 (ii) Medulla  
 (iii) Kidney pelvis  
 (iv) Artery  
 (v) Vein  
 (vi) Ureter

- (b) (i) ✗  
 (ii) ✓  
 (iii) ✓  
 (iv) ✗
- 3 (a) Drink plenty of plain water.  
 (b) Reduce the intake of salty food.
- 4 (a) salts  
 (b) semi-permeable  
 (c) urea, excess minerals  
 (d) Proteins, large  
 (e) Filtered blood, vein

### 3.3 Excretion in Plants

- 1 (a) Carbon dioxide  
 (b) Water vapour  
 (c) Oxygen  
 (d) Diffusion through stomata  
 (e) Transpiration  
 (f) Complex waste products
- 2 (a) - (v)  
 (b) - (i)  
 (c) - (iv)  
 (d) - (ii)  
 (e) - (iii)  
 (f) - (viii)  
 (g) - (vii)  
 (h) - (vi)

### ACTIVITY

Student's answer

### KBAT Coner

His conclusion is correct. The results show that urea can move across the Visking tube. However, water and mineral salts had already been present

in the salt solution at the beginning of the experiment.

Mukunthan did not know whether these two substances had moved out from the Visking tube.

### PISA/TIMSS Corner

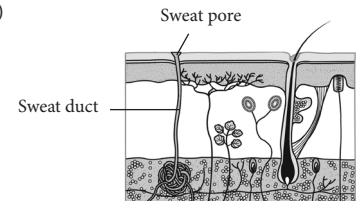
Plants form organic molecules which they need.

### MEMORY BOOST

- (a) Remove carbon dioxide and water  
 (b) Removes water, urea and mineral salts  
 (c) Removes water, urea and mineral salts  
 (d) (i) Filters out waste products from the blood  
 (ii) Regulates the balance of water and minerals salts in the body
- (e) Process that involves  
 (i) Respiration  
 (ii) Photosynthesis  
 (iii) Transpiration  
 Excretory product  
 (i) Carbon dioxide  
 (ii) Oxygen  
 (iii) Water  
 (iv) Mineral salts
- (f) (i) Resin  
 (ii) Latex  
 (iii) Tannin

### PT3 PRACTICE

1 (a)



- (b) 1. Removes waste products from the body  
 2. Detects stimuli such as touch, pressure, temperature and pain
- (c) Water  
 Urea
- 2 KIDNEY  
 3. MEDULLA  
 4. DIALYSIS  
 5. CORTEX

## CHAPTER 4 REPRODUCTION

### 4.1 Sexual and Asexual Reproduction

Sexual reproductions	Characteristics	Asexual reproduction
(a) Two individual	Number of parent	(b) One individual
(c) Occur	Fertilisation process	(d) Does not occur
(e) Involves male gamete (sperm) and female gamete (ovum)	The formation of gamete	(f) Does not involve gamete
(g) Not identical	The similarity of offspring with parent	(h) Identical

- 2 (a) (i) The fusion of nuclei of the male gamete and the female gamete occurs inside the body of the female.  
(ii) Cat and cow  
(b) (i) The fusion of nuclei of the male gamete and the female gamete occurs outside the body of the female.  
(ii) Fish and frog  
3 (a) A method of reproduction where parent cell divides into two daughter cells.  
(b) A method of reproduction where buds grow on the body of microorganism.  
(c) A method of reproduction where certain part of the organisms grows into a complete new individuals.  
(d) A method of reproduction where organism releases spore to form new individuals.  
(e) A method of reproduction where certain part of plant grows into new individuals.
- 4 (a) Paramecium  
Amoeba  
(b) Hydra, Yeast  
(c) Starfish  
Flatworm  
(d) Fern  
Mushroom  
(e) Strawberry  
Potato

#### 4.2 Male Reproduction System

- 1 (a) Testis  
Produces sperm  
(b) Scrotum  
Protects the testis  
(c) Penis  
Deposits sperm in the vagina  
(d) Sperm duct  
Carries sperm from the testis to the penis  
(e) Prostate gland  
Produces alkaline fluid that stimulates sperm activity  
(f) Urethra  
Carries sperm and urine at different time out of the body.
- 2 (a) genetic material, male  
(b) nucleus  
(c) Middle piece, energy  
(d) tail
- 3 (a) ✓ (f) ✓  
(b) ✓ (h) ✓  
(d) ✓

#### 4.3 Female Reproduction System

- 1 (a) Fallopian tube  
Fertilisation occurs here  
(b) Ovary  
Produces ovum  
(c) Uterus  
Place for the development and growth of the foetus

- (d) Cervix  
Connects the uterus to the vagina  
(e) Vagina  
Receives sperm from the penis
- 2 P : Cytoplasm  
Q : Cell membrane  
R : Jelly layer  
S : Nucleus  
(a) genetic material, mother  
(b) nucleus  
(c) Cytoplasm, nutrient  
(d) Jelly layer

3

Similarities		
1. Involved in fertilisation 2. Contains genetic substances		
↓ ↓		
Difference		
Produced in testis	Site of production	Produced in ovary
300 millions of sperms are produced in each ejaculation	Number of gametes being produced	1 ovum is produced in each ovulation
Small	Size	Very big size
3 days	Lifespan	1 day

- 4 (a) hormone, ovum  
(b) Menstruation  
(c) wider, bigger  
(d) taller, size  
(e) armpits, pubic  
(f) emotional, irritated  
(g) interest

#### 4.4 Menstrual Cycle

- 1 (a) 28  
(b) blood  
(c) W  
(d) X  
(e) ovulation  
(f) 14  
(g) fertile, ovulation, fertilised  
(h) premenstrual, thickens  
(i) W
- 2 (i) Take bath more frequent  
(ii) Change sanitary pad more frequent

#### 4.5 Fertilisation and Pregnancy

- 1 (a) Fertilisation, ovulation, copulation  
(b) Zygote, embryo  
(c) uterus wall, implantation  
(d) foetus

2

Structure	Nama	Function
P	Uterus wall	Place for the growth and implantation of embryo
Q	Placenta	Place for the exchange of nutrient, oxygen, carbon dioxide and waste product between the foetus and mother
R	Umbilical cord	Carries blood into and out of the foetus
S	Amniotic fluid	Absorbs shock

#### 4.6 Importance of Prenatal Care

- 1 (a) Protein  
(b) Folic acid  
(c) Calcium / Phosphorus  
(d) Carbohydrates / Fats  
(e) Fibre  
(f) Iron  
(g) Vitamin C

#### ACTIVITY

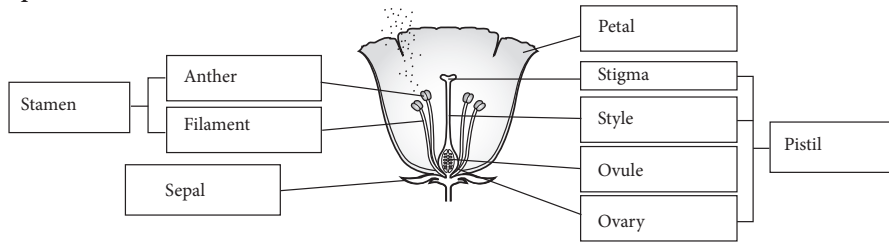
Student's answer

#### 4.7 Importance of Research in Human Reproduction

- 1 (a) Sterility  
(b) Sperm  
(c) (i) Ovulation  
(ii) Fallopian  
(d) hormone  
(e) Fallopian, surgery  
(f) In vitro fertilisation, Embryo
- 2 (a) Rhythm method  
(b) Ligation  
(c) Contraceptive pill  
(d) Diaphragm  
(e) Vasectomy  
(f) Condom  
(g) Intrauterine contraceptive device (IUD)  
(h) Spermicide
- 3 1. Financial burden of parents can be lessen with family planning.  
2. Couple who wants to have children can determine sterile problems.  
3. Family planning allows parents to have time for their child before having another.

#### 4.8 Sexual Reproductive System of Flowering Plants

1



- 2 (a) Stamen  
(b) Pistil  
(c) Petal  
(d) Sepal  
(e) Filament  
(f) Style  
(g) Anther  
(h) Stigma  
(i) Ovary  
(j) Ovule  
(k) Pollen grain

#### 4.9 Pollination

- 1 (a) transfer of pollen grain  
(b) (i) Self-pollination  
(ii) Cross-pollination  
(c) (i) Self-pollination  
(ii) Self-pollination  
(iii) Cross-pollination
- 2 (a) Small  
(b) Brightly coloured  
(c) Scented  
(d) Not scented  
(e) Present  
(f) Absent  
(g) Short  
(h) Less  
(i) More  
(j) Small, light and smooth  
(k) Short  
(l) Sticky
- 3 (a) two  
(b) Has variety  
(c) High  
(d) Good  
(e) Poor  
(f) one  
(g) No variety  
(h) Low  
(i) pollen grains
- 4 (a) seeds  
(b) changes  
(c) diseases

#### ACTIVITY

Student's answer

#### 4.10 Development of Fruits and Seeds in Plants

- 1 (a) Pollen grain  
(b) Pollen tube

- (c) Ovule  
(d) Stigma  
(e) Style  
(f) Ovary
- 2 (a) ✗ (e) ✗  
(b) ✓ (f) ✓  
(c) ✗ (g) ✓  
(d) ✓ (h) ✓

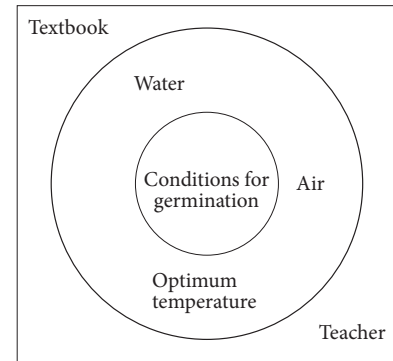
#### 4.11 Germination of Seeds

- 1 (a) Plumule  
(b) Radicle  
(c) Cotyledon  
(d) Testa  
(e) Endosperm  
(f) Cotyledon  
(g) Skin  
(h) Plumule  
(i) Radicle

2

Structure	Function
(a) Plumule	A part of embryo that develops into new shoot
(b) Radicle	A part of embryo that develops into roots
(c) Hilum	Protects the seed
(d) Testa	Site that stores and supplies food
(e) Cotyledon	Place where seed attaches to the fruit
(f) Micropyle	Allows air and water to enter the seed

3



- 4 (3), (1), (2), (4)

#### 4.12 Vegetative Reproduction in Flowering

##### Plants

- (a) Stems  
(b) Leaves  
(c) Roots  
(d) Grass  
(e) Lily  
(f) Yam  
(g) Artichoke  
(h) Fern  
(i) Tumeric  
(j) Pineapple  
(k) Bamboo  
(l) Begonia sp.  
(m) Tapioca  
(n) Carrot

#### KBAT Corner

- (a) Plant R  
(b) - The cross-pollination plants have high resistance to diseases.  
- The cross-pollination plants produce good quality seeds.

#### PISA/TIMSS Corner

- (a) No. This is because the layer of oil is preventing the air from coming into contact with the peas.  
(b) The peas in cup B will germinate.

#### MEMORY BOOST

- (a) (i) Binary fission  
(ii) Budding  
(iii) Spore formation  
(iv) Vegetative reproduction  
(v) Regeneration
- (b) (i) Zygote  
(ii) Embryo  
(iii) Foetus  
(iv) Baby
- (c) (i) Menstruation phase  
(ii) Repair phase  
(iii) Fertile phase  
(iv) Premenstrual phase
- (d) Stamen  
(e) Pistil
- (f) (i) Stem cutting  
(ii) Tissue culture

- (g) (i) Cross-pollination  
 (ii) Self-pollination  
 (h) (i) Water  
 (ii) Air  
 (iii) Temperature

### PT3 PRACTICE

- 1 X: Fallopian tube  
 Y: Uterus  
 (b) (i) ✓  
 (iii) ✓  
 2 (a) 1. Height  
 2. Size  
 (b) P : Cotyledon  
 Q : Testa  
 R : Radicle  
 (c) Stores food for dicotyledonous seed

## CHAPTER 5 GROWTH

### 5.1 Human Growth Pattern

- 1 (i) Infancy  
 (ii) Childhood  
 (iii) Adolescence  
 (iv) Adulthood  
 (v) Old age  
 (vi) Rapid  
 (vii) Slow  
 (viii) Rapid  
 (ix) Zero  
 (x) Negative  
 (b) Increases in body size, weight, number of cell and changes in body shape and its function.  
 (c) Body weight and height.  
 2 (a) 4  
 (b) 11 – 13; 13 – 18  
 (c) 11 – 13; 13 – 18  
 (d) adolescence  
 (e) active  
 (f) proteins, bones  
 (g) proteins

### KBAT Corner

- (a) – Does not consume balanced diet  
 – Malnutrition  
 – Lack of iron  
 (b) Teenage girls lost blood during menstrual cycle, therefore they need to intake more iron than teenage boys.

### PISA/TIMSS Corner

Carbohydrate provides energy to our body.

### MEMORY BOOST

- (a) weight, number of cells  
 (b) Very rapid  
 (c) Slow  
 (d) Rapid  
 (e) Minimum or zero  
 (f) Negative

- |     |                             |
|-----|-----------------------------|
| (f) | Same                        |
| (g) | Boys are faster than girls  |
| (h) | Girls grow faster than boys |
| (i) | Boys grow faster than girls |
- (j) (i) Proteins  
 (ii) Carbohydrates  
 (iii) Fats  
 (iv) Mineral and vitamins

### PT3 PRACTICE

- 1 (a) ✓ (b) ✗  
 (c) ✗ (d) ✓  
 2 (a) (i) P  
 (ii) Q  
 (b) Infancy and adolescence  
 (c) (i) 11 – 13 years old  
 (ii) 13 – 18 years old  
 (d) Children are active and carbohydrates supply energy.

## CHAPTER 6 LAND AND ITS RESOURCES

### 6.1 Minerals in the Earth's Crust

- 1 (a) Gold  
 Silver  
 Platinum  
 (b) Oxide  
 Carbonate  
 Sulphide  
 Silicate  
 2 (a) 

Lead	✓
Sulphur	✓

 (b) 

Copper	✓
Oxygen	✓
Carbon	✓

 (c) 

Tin	✓
Oxygen	✓

 (d) 

Aluminium	✓
Silicon	✓
Oxygen	✓

 3 (a) compound, crust  
 (b) dissolve  
 (c) oxide  
 (d) Metal oxide, sulphur dioxide, purple, colourless  
 (e) Carbon dioxide, cloudy

- 4 (a) metal oxide, carbon dioxide  
 (b) metal oxide, sulphur dioxide  
 (c) copper oxide  
 (d) iron oxide  
 (e) Lead carbonate

### 6.2 Reactions Between Metals and Non-metals

- 1 (a) metal oxide  
 (b) metal sulphide  
 (c) magnesium oxide  
 (d) copper sulphide  
 (e) sulphur  
 (f) Tin oxide  
 (g) iron  
 (h) different

### 6.3 Silicon Compounds

- 1 (a) Silica  
 (b) Silicate  
 (c) Sand  
 (d) Quartz  
 (e) Feldspar  
 (f) Mica  
 (g) Topaz  
 (h) Jade  
 (i) Clay  
 (j) Asbestos  
 2 (a) – (ii)  
 (b) – (iii)  
 (c) – (v)  
 (d) – (iv)  
 (e) – (i)  
 3 (a) silica  
 (b) clay  
 (c) fibre optic cable  
 (d) heat insulator  
 (e) insulators in electric iron  
 (f) silicate

### 6.4 Calcium Compounds

- 1 (a) salt  
 (b) calcium chloride  
 (c) sulphuric acid  
 2 (a) quicklime  
 (b) slaked lime  
 (c) lime water  
 (d) red, blue  
 3 (a) Calcium, carbon, oxygen  
 (b) Calcium, oxygen  
 (c) Calcium, hydrogen, oxygen  
 (d) Calcium, hydrogen, oxygen  
 4 (a) Shell of sea animals  
 (b) Limestone  
 (c) Corals  
 (d) Bones  
 5 Calcium carbonate  
 (a) marble  
 (b) gastric  
 Calcium oxide  
 (a) slaked lime  
 (b) purify



- Calcium hydroxide  
 (a) acidity  
 (b) lime water  
 Calcium hydroxide solution  
 – carbon dioxide

### 6.5 Natural Fuel Resources and Their Importance

- 1 (a) Wood  
 (b) Coal  
 (c) Petroleum  
 (d) Natural gas  
 (e) Carbon  
 (f) Hydrogen
- 2 (a) Coal  
 (b) Natural gas  
 (c) Petroleum
- 3 (a) Cooking gas  
 (b) Fuel for car and motorcycles  
 (c) Raw materials for petrochemical industry  
 (d) Fuel for aeroplane  
 (e) Fuel for heavy vehicles  
 (f) Lubricant  
 (g) Fuel for ships  
 (h) Surfacing roads

### ACTIVITY

Student's answers

### KBAT Corner

- Using a fuel saving devices
- Recycle the plastic making objects

### PISA/TIMSS Corner

- ✓ In the fume chamber  
 The sulphur dioxide released is poisonous.  
 Therefore, the heating must be conducted in a fume chamber

### MEMORY BOOST

- (a) Elements  
 1. Gold  
 2. Silver  
 3. Platinum  
 4. Mercury
- (b) Compounds  
 1. Carbonate  
 2. Oxides  
 3. Sulphides  
 4. Silicate
- (c) Silica  
 Silicon + Oxygen → Silica
- (d) Silicate  
 Metal + Silicon + Oxygen → Silica
- (e) Water, Calcium hydroxide, Calcium hydroxide solution
- (f) Metal oxide
- (g) Metal sulphide

### PT3 PRACTICE

- 1 (a) The lime water turns cloudy  
 (b) Calcium carbonate  $\xrightarrow{\text{heated}}$  calcium oxide + carbon dioxide  
 (c) (i) Immerse calcium carbonate into dilute hydrochloric acid  
 (ii) Calcium carbonate + hydrochloric acid calcium chloride → carbon dioxide + water
- 2 (a) P  
 (b) Petroleum floats on top of water because it is less dense than water.  
 (c) Fractional distillation  
 (d) (i) The colour becomes darker.  
 (ii) Fraction 1  
 (iii) Fuel for cars and motorcycles

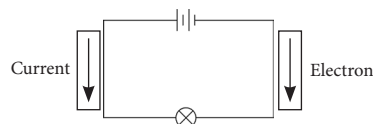
## CHAPTER 7 ELECTRICITY

### 7.1 Electrostatics

- 1 (a) Electrostatics  
 (b) repel, attract  
 (c) protons, electrons  
 (d) electrons, protons
- 2 (a) air, lightning  
 (b) lightning conductor  
 (c) door knob  
 radiation  
 (d) friction  
 metal chain  
 (e) aircraft, wheels

### 7.2 Electricity

- 1 – Power station  
 – Batteries  
 – Solar cell  
 – Lead acid accumulators
- 2 (a) – (iii) (b) – (i)  
 (c) – (ii) (d) – (iv)
- 3



### 7.3 Electric Current, Voltage and Resistor

- 1 To measure the electric current, ampere (A).  
 2 To measure the voltage, volt (V).  
 3 (a) series  
 (b) parallel

### 7.4 The Relationship Between Current, Voltage and Resistance

- (a) Length  
 (i) higher / more / greater
- (b) Thickness / Diameter  
 (ii) lower / less / smaller
- (c) Type of metal  
 (iii) different

### 7.5 Electric Circuits

- (a) Earth wire  
 (b) Switch  
 (c) Galvanometer

- (d) Dry cell  
 (e) Resistor  
 (f) Light bulb  
 (g) Ammeter  
 (h) Rheostat  
 (i) Voltmeter  
 (j) Transformer  
 (k) Fuse

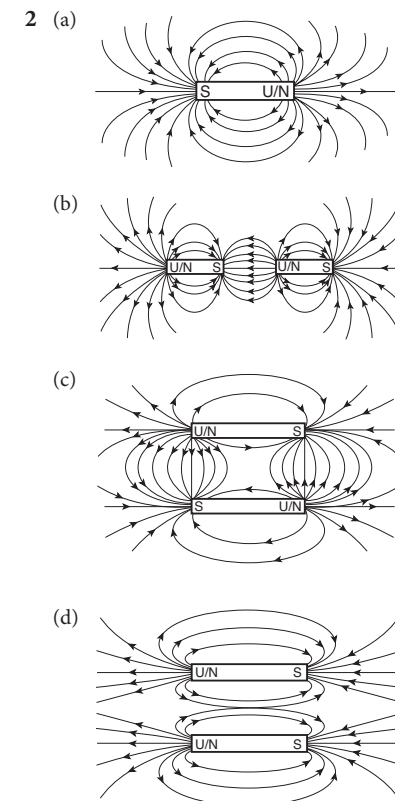
### 7.6 Series Circuit

### 7.7 Parallel Circuit

- 1 (a)  $I = I_1 = I_2 = I_3$   
 (b)  $I = I_1 + I_2 + I_3$   
 (c)  $V = V_1 + V_2 + V_3$   
 (d)  $V = V_1 = V_2 = V_3$   
 (e)  $R = R_1 + R_2 + R_3$   
 (f)  $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$
- 2 (a) dry cells, voltage, current  
 (b) decreases  
 (c) do not light up  
 (d) cannot  
 (e) remains the same  
 (f) remain lighted  
 (g) can  
 (h) does not increase

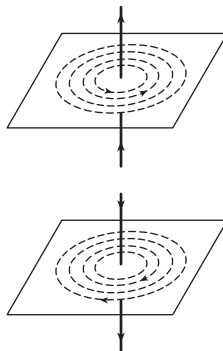
### 7.8 Magnetism

- 1 (a) ✓ (f) ✗  
 (b) ✓ (g) ✗  
 (c) ✗ (h) ✓  
 (d) ✗ (i) ✗  
 (e) ✓ (j) ✓



### 7.9 Electromagnetism

- right-hand grip rule
- (a)



#### **KBAT Corner**

Parallel circuit

#### **PISA/TIMSS Corner**

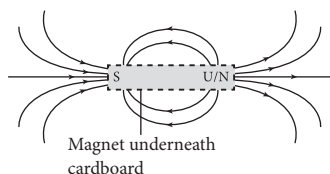
- Static electric charges are produced due to friction
- When two objects are rubbed together, electrons (negative charges) may be transferred from one object to another. This affects the balance between positive charges and negative charges. One object will become positively charged and the other will be negatively charged.

#### **MEMORY BOOST**

- static electrical charges
- attract
- repel
- (i) Parallel circuit  
(ii) Series circuit
- (i) ammeter  
(ii) Ampere (A)
- (i) Voltmeter  
(ii) Volt (V)
- (i) Ohm, ( $\Omega$ )  
(ii) 1. Length of conductor  
2. Diameter of conductor  
3. Types of conductor
- (i) current  
(ii) right-hand grip

#### **PT3 PRACTICE**

- (a)



- By placing the compass at different points around the magnet and determining the direction of the compass needle.
- (i) The needle will travel in a curved path but in the opposite direction.  
(ii) Float the needle horizontally in the water. The end that points towards the north is the north pole of the needle.

- (a) (i) Increases  
(ii) Decreases  
(b) The bulbs become dimmer.  
The brightness of the bulbs decreases.  
(Any one answer).  
The larger the current, the brighter the bulb.  
(c) Yes. The current flowing through all the bulbs is the same.  
(d) (i) 3  
(ii) 1  
(iii) 0.75  
(e) The voltage across B1 decreases as the number of bulbs increases. This happens because the voltage remains the same but has to be shared among more bulbs.

## **CHAPTER 8 GENERATION OF ELECTRICITY**

### **8.1 The Generation of Electrical Energy**

- (a) Thermal generator  
(b) Hydroelectric generator  
(c) Gas turbine generator  
(d) Diesel generator  
(e) Nuclear generator
- (a) (i) solar  
(ii) Solar cells  
(iii) Light energy  $\rightarrow$  electrical energy  
(b) (i) angin / wind  
(ii) angin / wind  
(iii) Kinetic energy  $\rightarrow$  electrical energy  
(c) biomass  
(i) thermal, natural  
(ii) Chemical energy  $\rightarrow$  Heat energy  
 $\rightarrow$  Kinetic energy  $\rightarrow$  Electrical energy  
(d) geothermal  
(i) Heat  
(ii) Heat energy  $\rightarrow$  Kinetic energy  $\rightarrow$  Electrical energy

### **8.2 Transformers**

- (a) Step-down transformer  
(i) Primary coil  
(ii) Secondary coil  
Bulb B1  
(b) Step-up transformer  
(i) Primary coil  
(ii) Secondary coil  
Bulb B2
- (a) ✗ (d) ✓  
(b) ✗ (e) ✗  
(c) ✓ (f) ✓
- Similarities**  
(a) Alternating current  
(b) Iron core, primary coil, secondary coil  
**Differences**  
(a) smaller  
(b) greater  
(c) lower  
(d) higher  
(e) greater  
(f) smaller

### **8.3 Electrical Power Transmission and Distribution System**

- Transformer station
  - Switch zone
  - National Grid Network
  - Main substation
  - Heavy industry
  - Branch substation
  - Branch substation
- (a) 11 kV (b) 132 kV (c) 132 kV  
(d) 132 kV (e) 240 V (f) 33 kV  
(g) 11 kV (h) 11 kV  
(i) 415 V or 240 V  
(j) 415 V (k) 240 V

### **8.4 Electrical Power Supply and Wiring System in Homes**

- (a) Live wire  
(b) Neutral wire  
(c) Main fuse  
(d) Main switch  
(e) Circuit breaker  
(f) Earth wire  
(g) Power circuit
- (a) Neutral wire  
– Blue  
(b) Earth wire  
– Green and yellow stripes  
(c) Live wire  
– Brown  
(d) Fuse
- (a) – (ix) (f) – (iv)  
(b) – (viii) (g) – (iii)  
(c) – (ii) (h) – (v)  
(d) – (vii) (i) – (i)  
(e) – (vi)

### **8.5 Cost of Electrical Energy Usage**

- The rate at which electrical energy is converted to other forms of energy by a electric appliances. S.I. unit for electrical power is watt (W) or joule per seconds ( $J s^{-1}$ ).
- (a) (i) Electric power  
= Voltan  $\times$  Current  
=  $110 V \times 5.0 A$   
=  $550 W$   
(ii) Electric energy  
= power  $\times$  time  
=  $550 W \times 30 \times 60$   
=  $990\,000 J$   
=  $990 kJ$   
(b) Electric energy  
= power  $\times$  time  
=  $1200 W \times 2 hr$   
=  $2400 Wj$   
=  $2.4 kWj$   
=  $2.4 unit$   
Cost of electricity used  
=  $2.4 unit \times 20 sen$   
=  $48 sen$



### 8.6 Fuse and Earth Wire

- 1 (a) thin wire, low  
(b) safety  
(c) (i) Break off the electrical circuit  
(ii) Flow current directly from appliance to the earth
- 2 (a) Catridge fuse  
(b) Replaceable wire fuse
- 3 (a) Power = Current  $\times$  Voltage

$$\text{Current} = \frac{900 \text{ W}}{120 \text{ V}} = 7.5 \text{ V}$$

$$\text{Rating of fuse} = 10 \text{ A}$$

- (b) Power = Current  $\times$  Voltage

$$\text{Current} = \frac{1500 \text{ W}}{120 \text{ V}} = 12.5 \text{ V}$$

$$\text{Rating of fuse} = 13 \text{ A}$$

### 8.7 Safety Precautions in the use of Electrical Energy

- 1 (a) an earth wire  
(b) a fuse  
(c) current leakage
- 2 (a) Do not overload a power point  
(b) Replace damaged electrical wire immediately  
(c) Does not repair electrical appliances without qualification  
(d) Always ensure that the chords and plug are not loosen.  
(e) Does not pull the wire when removing a plug.  
(f) Does not touch electrical appliances with wet hand.

#### ACTIVITY

Student's answers

### 8.8 Kepentingan Memelihara Tenaga Elektrik

- 1 - Switch off the lights that are not in use  
- Close doors and windows when the air-conditioner is switched on  
- Iron many clothes together at once

#### ACTIVITY

Student's answers

#### KBAT Corner

Water flows from a reservoir to moves the turbine and spin the dynamo to produce electrical energy.

#### PISA/TIMSS Corner

Circuit breaker will trip and cut off the current as soon as it detects a short circuit or an overload in the wiring.

#### MEMORY BOOST

Types of generator

- (a) Thermal  
(b) Hydroelectric  
(c) Diesel

- (d) Nuclear  
(e) Gas turbine

Electricity transmission and distribution system

- (a) Transformer station  
(b) National Grid Network  
(c) Main substation  
(d) Light industries  
(e) Branch substation  
(f) Residential area

Formula

- (a) Power, P  
= Current, I  $\times$  Voltage, V  
(b) Electric energy (kWh)  
= Power (kW)  $\times$  Time (hr)

Function of fuse and earth wire

- (a) To prevent current that is too large from flowing in a circuit  
(b) To carry leakage to the Earth.

#### PT3 PRACTICE

- 1 (a) (i) R  
(ii) S  
(iii) Q  
(b) Fuse. Melts and breaks the circuit when the current is too large.  
(c) To prevent electrocution by carrying current directly to the Earth in case of current leakage  
(d) A 3-pin plug has an earth wire while the 2-pin plug does not.
- (e) Current =  $\frac{1000 \text{ W}}{240 \text{ V}} = 4.2 \text{ A}$
- Suitable fuse rating = 5 A
- 2 (a) (i) heat  
(ii) silicon  
(b) 1. Diesel generator / Gas turbine generator  
2. Hydroelectric power station / Nuklear power station  
(c) This is because the solar energy is obtained from the Sun. The sources of energy is not stable as it is dependent on the weather. It cannot be used continuously in a long time as the solar cell takes time to regain the energy that had been used.

## CHAPTER 9 STARS AND GALAXIES

### 9.1 The Sun

- 1 (a) Corona  
(b) Chromosphere  
(c) Photosphere  
(d) Core
- 2 (a) Prominence  
(b) Solar flare  
(c) Sunspots
- 3 (a) Corona, Chromosphere, Photosphere  
(b) Corona  
(c) Chromosphere  
(d) Photosphere

- (e) Solar flare  
(f) Prominence  
(g) Sunspots  
(h) Core  
(i) Aurora  
(j) Helium

### 9.2 Stars and Galaxies in the Universe

- 1 (a) Spiral galaxy  
(b) Elliptical galaxy  
(c) Irregular galaxy
- 2 (a) core  
(b) Sun  
(c) distance, one year  
(d) Earth  
(e) colour, brightness  
(f) temperature  
(g) red, blue  
(h) constellation
- 3 (a) ✓ (b) ✓  
(c) ✗ (d) ✓  
(e) ✓ (f) ✗  
(g) ✓ (h) ✓
- 4 (a) Red giant, White dwarf  
(b) Red giant, Supergiant, Supernova, Neutron star  
(c) Red giant, Supergiant, Supernova, Black hole
- 5 (a) Spiral  
(b) Elliptical  
(c) Irregular
- 6 (a) Galaxy  
(b) Milky Way  
(c) Spiral galaxy  
(d) Universe  
(e) Irregular galaxy  
(f) Elliptical galaxy  
(g) Solar system  
(h) Nebula  
(i) Constellation  
(j) White dwarf  
(k) Edge of an arm of Milky Way
- (a) (i) closest  
(ii) energy  
(iii) death  
(iv) warms up  
(v) photosynthesis  
(vi) chemical  
(vii) animals  
(b) tidal

### 9.3 The Universe as a Gift from God

#### ACTIVITY

Student's answers

#### KBAT Corner

- (a) The lines have been drawn to join a group of bright stars in the sky to form certain patterns.  
(b) It is because the Earth rotates on its own axis. Therefore, the constellations seem to move across the sky at night.

**PISA/TIMSS Corner**

- 1 - The sun is the source of light and heat for life on Earth.
  - Plants need Sun for photosynthesis.
  - The energy from Sun is an alternative source of energy.
- 2 The Sun generates its energy through a nuclear reaction called nuclear fusion.

**MEMORY BOOST**

- (a) (i) Corona  
(ii) Chromosphere  
(iii) Photosphere
- (b) (i) Prominence  
(ii) Solar flares  
(iii) Sunspots
- (c) A spherical body that releases heat and light energy during nuclear reaction.
- (d) (i) Size  
(ii) Brightness  
(iii) Colour  
(iv) Temperature
- (e) A group of billions stars, planets dust and gases

- (f) (i) Spiral  
(ii) Elliptical  
(iii) Irregular
- (g) (i) Essential for photosynthesis  
(ii) Generates electricity
- (h) (i) Calendar based on phases of the Moon  
(ii) Affect the occurrence of ocean tidal

**PT3 PRACTICE**

- 1 (a) Q - White dwarf  
R - Red giant  
S - Supernova  
(b) Neutron star  
(c) A very dense object with gravity that is so strong that even light cannot escape from it.  
(d) A white dwarf
- 2 (a) (i) Dust  
(ii) Hydrogen  
(iii) Helium  
(b) (i) Giant  
(ii) Supergiant  
(iii) Dwarf

- 4 RazakSAT, TiungSAT, MEASAT-3b
- 5 (a) Communication  
(b) Weather forecasting  
(c) Defence  
(d) Navigation  
(e) Remote sensing
- 6 (a) Environment  
(b) Agricultural  
(c) Forestry  
(d) Geology
- 7 1. Migrating to a new planet  
2. Finding more resources from other planets  
3. Finding new sources of food and water from other planets

**KBAT Corner**

- (a) X : Rocket  
Y : Space shuttle
- (b) - Y can be used to make multiple trips.  
- Y is cheaper than X.

**PISA/TIMSS Corner**

If there is no satellites in this world, then there will be no communication satellites and we would not be able to communicate effectively. Without weather satellites, there would be little or no warning of disastes such as typhoons and tornadoes that would cause thousands of deaths.

**MEMORY BOOST**

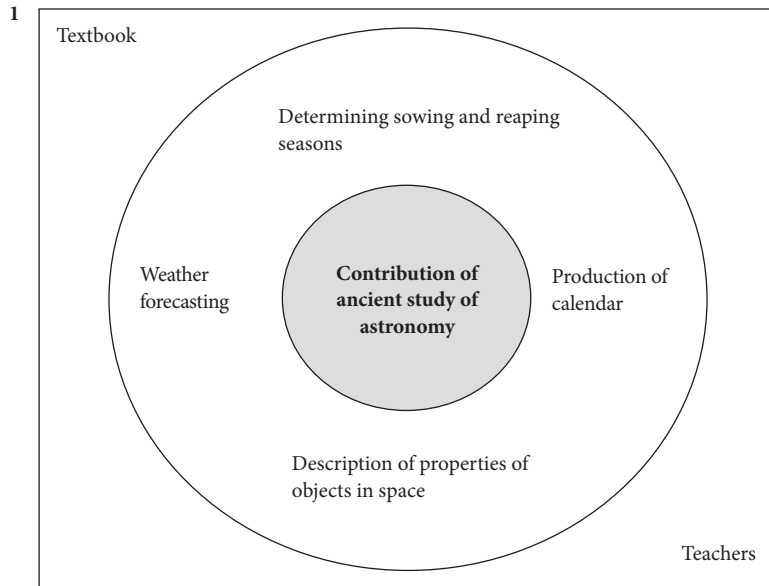
- (a) (i) Telescope  
(ii) Rocket  
(iii) Space shuttle  
(iv) Space probe  
(v) Space station  
(vi) Satellite
- (b) (i) Communication  
(ii) Navigation  
(iii) Remote sensing  
(iv) Meteorology  
(v) Military
- (c) (i) To gather new knowledge about the universe  
(ii) Help to understand how the Earth was formed

**PT3 PRACTICE**

- 1 (a) Satellite  
(b) Rocket and space shuttle  
(c) Locate natural resources such as petroleum and minerals / Monitor and map forests / Detect soil conditions / Detect and monitor oil spill and forest fires (any one answer)  
(d) Transmit signals for television, radio, telephone and other communication systems / Weather forecasting
- 2 (a) (i) P : Radio telescope  
(ii) Q: Hubble space telescope  
(b) (i) Q  
(ii) Solar energy  
(c) (i) P: To detect and collect radio waves from the outer space  
(ii) Q: To take photos from the outer space and send back to the Earth.

**CHAPTER 10 SPACE EXPLORATION**

**10.1 Developments in the Field of Astronomy and Space Exploration**



- 2 (a) - (i)                      (b) - (iii)  
(c) - (ii)                     (d) - (v)  
(e) - (iv)

3

Invention	Name	Function
(a)	Space probe	Send images and data to the Earth
(b)	Space station	Floats in space to allow astronauts to carry out scientific investigation in the space
(c)	Space telescope	Helps astronomers to discover objects in the space
(d)	Space shuttle	To carry astronauts and the supplies to the space station

- 3 (a) R : Space shuttle  
S : Space probe  
(b) R : Transport astronaut and equipment and launches satellite to the orbit from the outer space  
S : Collects and send information back to the Earth from the outer space  
(c) 1. Space station  
2. Rocket  
(d) (i) ✗  
(ii) ✓

### PRACTICAL

#### Experiment 1.1

Observation:

Observation	Inference
increases	hot
black	tar
green, yellow	acidic

Discussion:

- to suck the cigarette smoke across the apparatus
- (a) dries up  
(b) black  
(c) corrodes
- Emphysema, alveoli in the lung erupt when they are corroded by acidic substances in the cigarette smoke // Lung cancer. Tar from the cigarette smoke is carcinogenic.

Conclusion:  
harmful

#### Experiment 2.1

Results

A – Bright red

B – Dark red

Discussion:

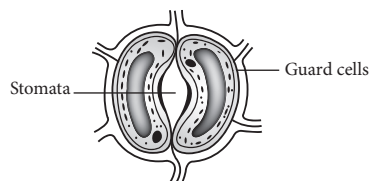
Oxygenated blood contains more oxygen than deoxygenated blood. Deoxygenated blood contains more carbon dioxide than oxygenated blood.

Conclusion:

bright-red, dark red

#### Experiment 2.2

Discussion:



Observation:

- pores
- size, bean
- (a) Carbon dioxide  
(b) Oxygen  
(c) Water, water vapour
- wilting, leaves

Conclusion:  
stomata, gases exchange in the leaves

#### Experiment 2.3

##### A Air movement

Hypothesis:  
faster, higher

Variables:

- Presence of wind
- Rate of transpiration
- Type of plant / Humidity / Light intensity / Temperature of the surrounding

Results:

Initial mass (g)	Final mass (g)	Loss of mass (g)
210.5	207.3	3.2
210.9	209.3	1.6

##### B Surrounding temperature

Hypothesis:  
increases

Variables:

- Surrounding temperature
- Rate of transpiration
- Type of plant / Humidity / Light intensity / Presence of wind

Results:

Initial mass (g)	Final mass (g)	Loss of mass (g)
200.5	197.4	3.1
207.9	204.0	3.9

##### C Air humidity

Hypothesis:  
decreases

Variables:

- Air humidity
- Rate of transpiration
- Type of plant / Surrounding temperature / Light intensity / Presence of wind

Results:

Initial mass (g)	Final mass (g)	Loss of mass (g)
190.3	188.2	2.1
193.9	192.8	1.1

##### D Light intensity

Hypothesis:  
increases

Variables:

- Light intensity
- Rate of transpiration
- Type of plant / Humidity of air / Surrounding temperature / Presence of wind

Results:

Initial mass (g)	Final mass (g)	Loss of mass (g)
187.2	185.1	2.1
202.3	201.1	1.2

Discussion:

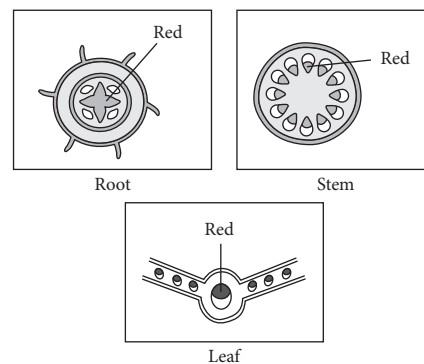
- (a) greater  
(b) more
- (a) greater  
(b) energy, evaporate
- (a) absorb moisture  
(b) greater  
(c) evaporation
- (a) greater  
(b) open wider

Conclusion:

air movement, surrounding temperature, air humidity and light intensity

#### Experiment 2.4

Observation:



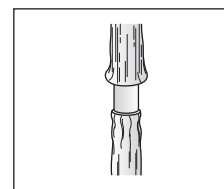
Discussion:

- To show the part of the plants that transports water
- Xylem

Conclusion: xylem

#### Experiment 2.5

Observation:



End of experiment

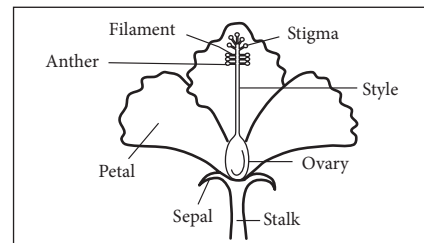
Discussion:

- swollen, food substances
- shrunk, food supply
- Phloem tissue. To transport food substances in plant.

Conclusion: phloem

#### Experiment 4.1

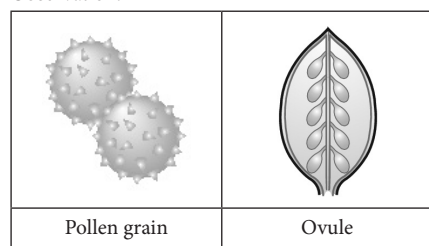
Observation:



Discussion:

1. anther, filament
2. stigma, style, ovary

Observation:



Discussion:

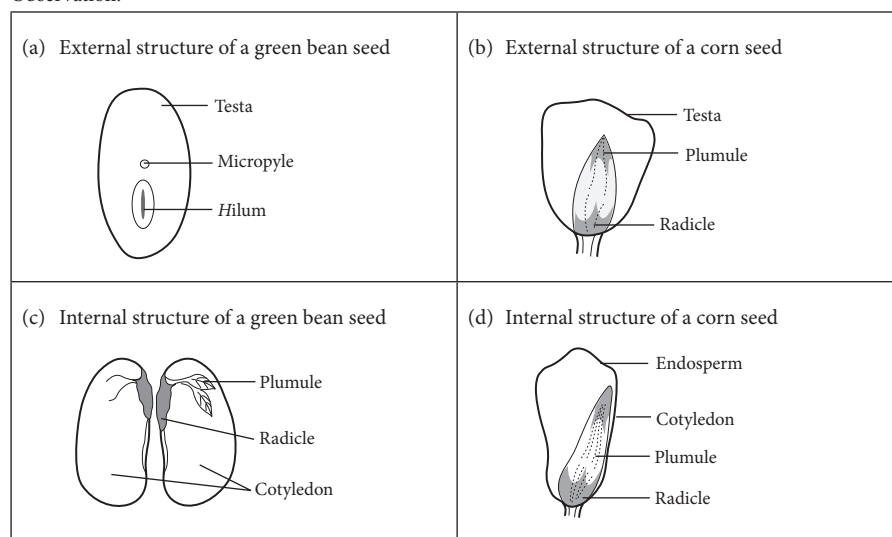
1. rough
2. five, two

Conclusion:

filament, anther, stigma, style, ovary

Experiment 4.3

Observation:



Discussion:

1. (i) grows into shoot  
(ii) Grows into root  
(iii) Stores up nutrient for germination  
(iv) Stores up nutrient for germination
2. (i) Protects the seed  
(ii) Allows air and water to enter  
(iii) Attaches the seed to the fruit

Conclusion:

testa, micropyle, hilum, plumule, radicle, cotyledon, endosperm

Experiment 4.4

Hypothesis:

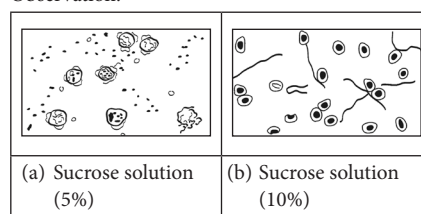
Water, oxygen, suitable temperature

Variables:

- (a) Water, oxygen, suitable temperature
- (b) Germination of seed
- (c) Type of seed

Experiment 4.2

Observation:



Discussion:

1. sucrose solution (10%), sucrose solution (5%)
2. concentrated
3. stigma

Conclusion:

sugary

1. testa
2. respiration
3. enzyme
4. photosynthesis
5. will not

Conclusion:

Water, oxygen, suitable temperature

Experiment 6.1

**A Reaction between metals and oxygen**

Observation:

- (a) oxygen
- (b) separate the metals from potassium manganate (VII)
- (c) slow down the release of oxygen from the boiling tube
- (d) No
- (e) (i) Magnesium oxide  
(ii) Aluminium oxide  
(iii) Zinc oxide  
(iv) Iron oxide
- (f) Iron → Zinc → Aluminium → Magnesium

Conclusion:

metal oxide

**B Reaction between metals and sulphur**

Observation:

Metal	Observation during heating	Colour of product
(a)	Burn rapidly	Black
(b)	Burn rapidly	Black
(c)	Glow rapidly	Black
(d)	Glow slowly	Black

Discussion:

- (a) No
- (b) (i) Magnesium oxide  
(ii) Aluminium oxide  
(iii) Zinc oxide  
(iv) Iron oxide
- (c) Iron → Zinc → Aluminium → Magnesium

Conclusion:

metal sulphide

Experiment 6.2

Observation:

Silicone compound	Solubility in water	Effect of heating	Reaction with acid
Sand	Insoluble	No changes	No changes
Quartz	Insoluble	No changes	No changes
Clay	Insoluble	No changes	No changes

Observation:

1. K
2. did not germinate

Discussion:

Set	Water	Oxygen	Suitable temperature	Germination
J	✓	✓	✗	Did not germinate
K	✓	✓	✓	Germinate
L	✗	✓	✓	Did not germinate
M	✓	✗	✗	Did not germinate

Conclusion:  
insoluble in water, do not decompose when heated and do not react with acids

Experiment 6.3

Observation:

Observation	Discussion
I does not dissolve	-

II cloudy	calcium chloride + water + carbon dioxide
III cloudy	calcium oxide + carbon dioxide

Conclusion:

- (a) Insoluble in water
- (b) acid, carbon dioxide
- (c) heat, carbon dioxide

Experiment 6.4

Observation:

Fraction	Colour	Viscosity	Flammability	Amount of soot
I	Colourless	Not viscous	Very flammable	No soot
II	Pale yellow	Slightly viscous	Flammable	A little soot
III	Yellow	Viscous	Less flammable	A lot of soot
IV	Brown	Very viscous		Most soot

Conclusion:

1. darker
2. more
3. less
4. more

Experiment 7.1

Results:

Results	Observation
1	attracted
2	towards
3	attracted
4	diverges

Conclusion:

1. attract
2. electroscopes

Experiment 7.2

Types of rods	Results	Observation
Polythene – polythene	repel	same
Cellulose acetate – Cellulose acetate	repel	same
Polythene – cellulose acetate	attract	different

Conclusion:

1. repel
2. attract

Experiment 7.3

Observation:

deflects

Discussion:

1. static
2. earth
3. current
4. electric current

Conclusion:

Van de Graaff generator, galvanometer

Experiment 7.4

Observation:

1. lights up
2. 2.8 V
3. 0.5 A

Discussion:

1. voltmeter
2. volt, V
3. parallel
4. ammeter
5. ampere, A
6. series

Conclusion:

1. voltmeter
2. ammeter

Experiment 7.5

Aim: the relationship between resistance and current

Hypothesis:

resistance, current

Variables:

- (a) resistance
- (b) current
- (c) voltage

Procedure:

1. A nichrome wire is fixed on a metre rule. The two ends of the wire are fixed at the two ends of the metre rule.
2. The circuit is connected as in the diagram.
3. The jockey is placed 20 cm away from the nail on the left side.
4. The ammeter reading is recorded.
5. The jockey is placed at 40 cm, 60 cm, 80 cm and 100 cm away from the nail on the left side.
6. The ammeter readings are recorded.

Observation:

Distance of the jockey from the nail (cm)	Reading of ammeter (A)
20	1.2
40	1.0
60	0.8
80	0.6
100	0.4

Discussion:

1. (a) increases  
(b) increases
2. decreases, current

Conclusion:

1. resistance
2. accepted

Experiment 7.6

Aim:

voltage, current

Hypothesis:

the higher the current

Variables:

- (a) voltage
- (b) current
- (c) resistance

Procedure:

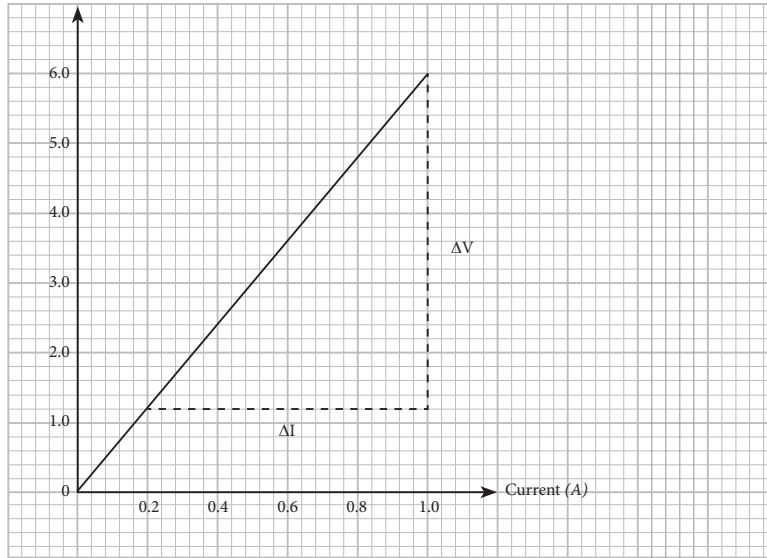
1. The circuit is connected as in the diagram above.
2. The switch is closed and the readings of voltmeter and ammeter are recorded.
3. More dry cells are connected in series one by one until 5 dry cells are connected.
4. The readings of voltmeter and ammeter are recorded for each a dry cell added.

Observation:

Reading of voltmeter (V)	Reading of ammeter (A)
1.2	0.2
2.4	0.4
3.6	0.6
4.8	0.8
6.0	1.0

Discussion:

1. Voltage (V)



2. Current is directly proportional to voltage.

3. Gradient :  $\frac{6.0 - 1.2}{1.0 - 0.2} = 6$

4. resistance,  $6 \Omega$

5.  $\frac{\text{Voltage}}{\text{Current}}$

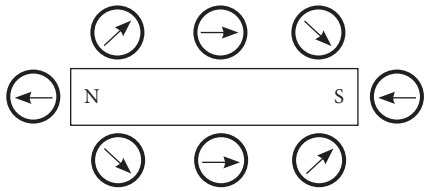
Conclusion:

1. The higher, greater
2. accepted

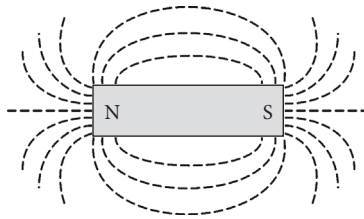
Experiment 7.7

Observation:

(a) The direction of the compasses.



(b) The magnetic field formed by iron filings.



Discussion:

1. iron filings
2. Magnetic field lines
3. compass

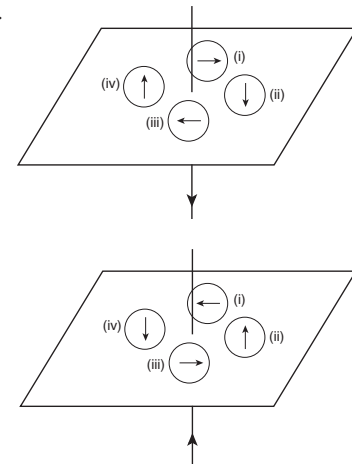
Conclusion:

- (a) The magnetic field lines start at the North Pole and end at the South Pole.
- (b) The magnetic field lines do not cross one another.

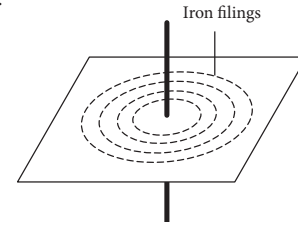
Experiment 7.8

Observation:

1.



2.



Discussion:

1. electric, magnet
2. temporary
3. circular
4. compasses

Right-hand grip rule:

- (a) current
- (b) magnetic field

Conclusion:

current

Experiment 8.1

Observation:

1. burns and spoils
2. burns, does not burns

Discussion:

1. short-circuit, parallel, resistance, spoils
2. will not spoil, burns and melts
3. excessive current