PHYSICS

A

Acceleration: Acceleration is the rate of change of velocity.

Formula: a= change in velocity / time taken

Units: m/s^2 or ms^{-2}

Alternating current: Current that travels in one direction for one hundredth of a second but the opposite direction for the next hundredth of a second.

Amplitude: The amplitude of a wave is the height of the crest above the average position.

Area: Area is the amount of surface enclosed within the boundary lines.

B

Biomass: This is the chemical energy stored in fast growing plants.

C

Centre of gravity: The centre of gravity of an object is the point through which all the weight appears to act.

Compass: A magnet, which is free to rotate and indicate direction.

Concave lens: A concave lens is a lens that spreads out light rays (diverging lens).

Condensation: This is the changing of a gas to a liquid state.

Conduction: This is the transfer of heat through a solid, without the movement of the solid.

Convection: This is the transfer of heat through a liquid or a gas when molecules of the liquid or gas move and carry the heat.

Convex lens: A convex lens is a lens that brings light rays together (converging lens).

Current: Current is a flow of charge.
Unit: Ampere (A)

D

Density: Density is the mass per unit volume of the substance.

Formula: $$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

Units: g/cm^3 or $g\ cm^{-3}$

Direct Current: Current that travels in one direction only (i.e. from the positive terminal to the negative terminal).

Dispersion: This is the splitting up of white light into separate colours. It can be done by passing white light through a prism.

E

Energy: Energy is the ability to do work.

Equilibrium: An object that is balanced is said to be in equilibrium.

F

Force, F: A force is that which causes a change in the velocity of an object.
Unit: Newton, N
Formula: Force = Mass x Acceleration ($F = ma$)

Freezing: This is the changing of a liquid to a solid state.

Frequency, f: This is the number of waves that pass a particular point in one second.

Friction: This is a force which opposes motion between two objects in contact.

Fuse: A fuse is a safety device in an electric circuit. If the current gets too high the wire in the fuse melts which breaks the circuit switching off the current.

G

Galaxy: A large group of stars held together by its own gravity.

H

Heat: Heat is a form of energy.
Unit: Joules, J

I

Insulator: With regard to heat - is a substance, which does not allow heat to flow through easily.

Or – with regard to electricity - a substance which does not conduct electricity.

L

Latent heat: This is the heat absorbed or released when a substance changes state without changing temperature.

Law of conservation of energy: Energy cannot be created or destroyed but can be converted from one form to another.

Law of the lever: When a lever is balanced the sum of the clockwise moments is equal to the sum of the anti clockwise moments.

Lever: A lever is a rigid body, which is free to turn about a fixed point called the fulcrum.

Light: Light is a form of energy.

Loudness: The loudness of a sound depends on the amplitude

Lubricant: A lubricant is a substance capable of reducing friction.

Luminous: A luminous object is an object that gives out light.

Lunar eclipse: This happens when the earth passes between the sun and the moon.

M

Magnetic field: A space around a magnet in which the magnetism can be detected.

Mass, m: The mass of an object is the quantity of matter in it (Measured in kg)

Melting: This is the changing of a solid to a liquid state.

Moment: This is a measure of the turning effect of a force.
Formula:
Moment of a force = Force x Perpendicular distance from the fulcrum.

N

Newton's third law of motion: For every action there is an equal but opposite reaction.

O

Ohm's law: At constant temperature the voltage across a conductor is proportional to the current flowing through it.
Formula: Voltage = Current x Resistance ($V = IR$)

P

Pitch: The pitch of a sound is how high or low it is. It depends on the frequency of the wave.

Potential difference: Potential difference is also called voltage. It is the force, which moves the electrons around the circuit.
Unit: Volt (V)

Power: This is the rate at which energy is converted from one form to another.
Unit: Watts (W)
Formula: Power = Voltage x Current (*P = VI*)

Pressure: Pressure is force per unit area.
Formula: $\text{Pressure} = \dfrac{\text{Force}}{\text{Area}} \left(P = \dfrac{F}{A} \right)$
Unit: N/m^2 or Pascal (Pa)

R

Radiation: This is the transfer of heat by means of invisible rays, which travel outwards from the hot object, without needing a medium.

Rectifier: This is used to convert alternating current to direct current.

Reflection: The reflection of light is the bouncing back of light from a surface.

Refraction: The refraction of light is the bending of light as it passes from one medium to another.

Resistance, R: The opposition of a conductor to current is called its resistance. A good conductor has a low resistance and a bad conductor has a high resistance.

S

Solar eclipse: This happens when the moon passes between the sun and the earth.

Sound: Sound is a form of energy.

Speed, v: Speed is the distance travelled per unit time.

Formula: $\text{Speed} = \dfrac{\text{Distance}}{\text{Time}}$

Unit: m/s or ms^{-1}

Stable equilibrium: A body is in stable equilibrium if when slightly moved its centre of gravity rises.

Sublimation: This is the changing of a solid directly to a gas.
(Iodine is an example of a substance that sublimes).

T

Temperature: This is a measure of how hot an object is.
Unit: degrees Celsius (°C)

U

Unstable equilibrium: A body is in unstable equilibrium if when slightly moved its centre of gravity falls.

V

Velocity: Speed in a given direction.
Units: m/s

Volume: The volume of an object is the amount of space it takes up (measured in m^3 or cm^3).

W

Wave: A wave is a means of transferring energy from one point to another.
Formula: Velocity = Frequency x Wavelength $\left(v = f \times \lambda \right)$

Wavelength: The wavelength of a wave is the distance between any two successive crests.

Weight: Weight is the force of gravity on an object.
Formula: Weight = Mass x Acceleration due to gravity

CHEMISTRY

A

Acid rain: Rainwater with a pH of less than 5.7 is acid rain. It is caused by the gases NO_2 (from car exhaust fumes) and SO_2 (from the burning of fossil fuels) dissolving in rain. Acid rain kills fish, kills trees, and destroys buildings and lakes.

Acid: An acid is a proton donor. It turns litmus red.

Activity Series: The activity series is a list of metals in order of decreasing reactivity. From our experiment we found the following series of activity Ca>Mg>Zn>Cu

Alkali metals: These are the elements in group one in the periodic table.

Alkaline earth metals: These are the elements in group two in the periodic table.

Alloy: An alloy is a mixture of metals. Bronze is an example of an alloy it is formed from copper and tin. Brass is a mixture of Copper and Zinc

Atom: An atom is the smallest part of an element, which can exist.

Atomic number: The atomic number of an atom is the number of protons in the nucleus of the atom.

B

Base: It turns litmus blue. Has pH > 7 and a soapyfeeling.

C

Capillarity: This is the rising of liquids up a narrow tube.

Catalyst: A chemical that speeds up or slows down chemical reactions (eg manganeese dioxide (MnO_2) is the catalyst that causes H_2O_2 (hydrogen peroxide) to breake down to O_2 and water)

Chemical change: A chemical change is one in which there is a new substance formed.

Cobalt chloride paper: This paper is used to test for water. If water is present it changes colour from blue to pink.

Combustion: Combustion is also called burning. This is the combining of a substance with oxygen.

Compound: A compound is a substance made up of two or more elements chemically combined.

Corrosion: Corrosion is an undesired process where a metal is converted to one of its compounds, e.g. rusting.

Covalent bond: A covalent bond is a force of attraction between two atoms as a result of their sharing of electrons.

D

Distillation: The vaporisation of a liquid by heating and then the condensation of the vapour by cooling.

Ductile: Metals are ductile. This means they can be pulled out to form wires.

E

Electrode: An electrode is a conductor, which dips into an electrolyte and allows the electrons to flow to and from the electrolyte.

Electrolysis: This is the production of a chemical change using electricity. Electrolysis can be used to split up water into hydrogen and oxygen.

Electrolyte: An electrolyte is a substance which when dissolved in water conducts electricity.

Electroplating: This is where a metal is covered with a layer of another metal using electricity.

Element: An element is a substance, which cannot be split up into simpler substances by chemical means.

Endothermic reaction: An endothermic reaction is a reaction that takes in heat, e.g. adding water to ammonium chloride.

Exothermic reaction: An exothermic reaction is a reaction that gives out heat, e.g. burning of coal.

F

Fossil fuels: Fuels that were formed from the remains of plants and animals that lived millions of years ago.

Fuel: A fuel is any substance that burns in oxygen to produce heat.

H

Halogens: These are the elements in group seven in the periodic table.

Hard water: This is water that finds it difficult to form lather with soap due to presence of Ca or Mg ions.

I

Immiscible liquids: These are liquids that do not mix to form a solution, e.g. oil and water.

Indicator: An indicator is a substance, which shows by means of a colour change if a substance is acidic or basic.

Ion Exchange: This is a method of removing hardness from water. It replaces the positive ions that cause the hardness with H+ ions.

Ion: An ion is a charged atom or group of atoms, e.g. Na^+.

Ionic bond: An ionic bond is a force of attraction that occurs between oppositely charged ions in a compound. It results from a transfer of electrons.

J

Joule: This is the unit of energy and work.

M

Malleable: Metals are malleable. This means they can be hammered into sheets.

Mass number: The mass number of an atom is the number of protons and neutrons in the nucleus of the atom.

Matter: Matter is anything which occupies space and has mass.

Miscible liquids: These are liquids that mix to form a solution, e.g. alcohol and water.

Mixture: A mixture consists of two or more different substances mingled together but not chemically combined.

Molecule: A molecule consists of two or more atoms chemically combined.

N

Neutralisation: This is the reaction between an acid and a base to give salt and water.

O

Octet rule: During bonding atoms tend to reach an electron arrangement with eight electrons in the outermost shell.

Oxidation: Oxidation is the addition of oxygen or the losing of electrons.

P

pH scale: This is a scale from 0 to 14.
If the pH of a solution is 7 it is neutral; if the pH of a solution is less than 7 it is acidic; if the pH of a solution is greater than 7 it is basic.

Permanent hardness: This is hardness in water that cannot be removed by boiling. It is caused by calcium sulphate.

Physical change: A physical change is one in which there is no new substance formed.

Products: These are the chemicals that are produced in a chemical reaction.

R

Reactants: These are the chemicals that react together in a chemical reaction.

Reduction: Reduction is the removal of oxygen or the gaining of electrons.

S

Salt: A salt is formed when the hydrogen of an acid is replaced by a metal.

Saturated Solution: A solution, which contains as much solute as it can hold at that temperature.

Solution: A solution is a mixture of a solute (usually a solid) and a solvent (usually a liquid).

Suspension: A suspension is a mixture of a liquid and a finely divided insoluble solid.

T

Temporary hardness: This is hardness in water that can be removed by boiling. It is caused by calcium hydrogencarbonate.

Titration: This is the process of adding one solution from a burette, to a measured amount of another solution to find out exactly how much of each is required to react.

V

Valency: The valency of an element is the number of electrons an atom of the element wants to gain, lose or share so as to have a full outer shell.

BIOLOGY

A

Absorption: This is the movement of food into the bloodstream.

Amylase: This is an enzyme. It is found in saliva. It breaks starch down into maltose.

Antagonistic muscles: A pair of skeletal muscles that work together. When one contracts the other relaxes, e.g. the biceps and triceps.

Asexual reproduction: Reproduction that does not involve gametes.

Assimilation: This is the using of the food by the cells of the body after absorption.

B

Benedict's solution: This is used to test for a reducing sugar e.g. glucose. If a reducing sugar is present it turns brick red after being heated in a boiling water bath. (Fehlings solution does exactly the same)

Breathing: This is a physical process of taking in oxygen and breathing back out carbon dioxide.

Balanced Diet: Eating the correct amounts of the different food types

C

Carnivore: An animal that only eats other animals.

Carpel: The female part of the flowering plant. It is made up of the stigma, style and ovary.

Cell wall: Structure found outside the cell membrane in plant cells. Cell walls are absent in animal cells.

Chlorophyll: The green pigment found in the chloroplasts of plant cells. It is used in photosynthesis.

Competition: This is the struggle between organisms to gain a sufficient supply of a scarce resource e.g. Grasses and dandelions compete for water.

Conservation: This is the wise use of the environment:

D

Digestion: This is the breaking down of food into small soluble pieces.

Dispersal: The dispersal of seeds is the scattering of seeds. The advantage of dispersal is that it helps reduce competition.

E

Egestion: The getting rid of unused, undigested and unabsorbed food material

Endocrine glands: A ductless gland that releases hormones directly into the bloodstream, e.g. the pancreas (it releases insulin which controls blood sugar level).

Excretion: This is the getting rid of waste products from chemical reactions in the body.

F

Food chain: A food chain is a feeding relationship between organisms through which energy is transferred.

Food web: A food web is a number of interconnected food chains.

G

Gamete: A gamete is a sex cell. The male gamete is the sperm and the female gamete is the egg.

Genetics: This is the study of inheritance.

Geotropism: The growth of a plant in response to gravity.

Germination: Germination is the growth of a seed into a new plant. The requirements are warmth, moisture and oxygen.

H

Habitat: The place where a plant or animal lives is called its habitat.

Haemoglobin: The red pigment in red blood corpuscles. It is involved in transporting oxygen.

Herbivore: An animal that eats only plants.

Hormone: A chemical substance that is released by an endocrine gland.

Humus: The organic material of soil. It is formed from decomposing plants and animals.

I

Implantation: This is when the embryo attaches itself to the womb wall.

Ingestion: This is the taking in of food into the mouth.

Iodine solution: This is used to test for starch. If starch is present it turns blue-black.

Iris: The iris controls the amount of light entering the eye.

J

Joint: This is where two or more bones meet.

L

Leaching: The washing of minerals out of the soil.

Ligaments: Fibres that connect bone to bone.

Lime water: This is used to test for the presence of carbon dioxide. If carbon dioxide is present the lime water turns milky.

M

Motor nerve: A nerve that carries messages away from the brain and spinal cord.

N

Nutrient agar: This is used as a food supply for bacteria and fungi in the lab.

O

Omnivore: An animal that eats plants and animals.

Organ: A group of tissues working together e.g. heart.

Ovulation: This is the release of an egg from an ovary.

P

Phloem: This is a plant transport tissue. It transports food from where it is made to other parts of the plant.

Photosynthesis: This is the process in which green plants make food.

Phototropism: The growth of a plant in response to light.

Placenta: The structure that binds the developing baby to the wall of the womb. It allows nutrients and waste to be exchanged.

Pollination: This is the transfer of pollen from the anther of the stamen to the stigma of the carpel.

Pollution: This is where things such as oil, sewage, slurry, sulphur dioxide, nitrogen oxides and litter damage the environment.

Pooter: A piece of equipment used to collect small animals.

Producer: An organism that can make its own food.

R

Respiration: This is a chemical process where energy is released from food.

Retina: The light sensitive layer at the back of the eye.

S

Sensory nerve: A nerve that carries messages to the brain and spinal cord.

Soda lime: This is used to absorb carbon dioxide.

Stamen: The male part of the flowering plant. It is made up of the anther and filament.

Stomata: These are pores (openings) in the leaves of a plant, which allows gases to diffuse.

Synovial fluid: A lubricating fluid found at a joint. It helps reduce friction.

System: A group of organs working together e.g. digestive system.

T

Tendons: Fibres that attach muscle to bone.

Tissue: A group of similar cells e.g. muscle.

Transpiration: This is the loss of water vapour from the surface of a plant. It is highest when there is a gentle breeze, sun and low humidity.

Trophic level: The position an organism occupies in a food chain.

Tropism: A growth response to a stimulus.

Tullgren funnel: A piece of equipment used to extract small animals from leaf litter or soil.

X

Xylem: This is a plant transport tissue. It transports water and minerals from the roots to other parts of the plant.

Z

Zygote: The cell, which results from the fusion of a male and female gamete.

Formulae in Junior Cert Science

Please remember to photocopy 4 pages onto one sheet by going A3→A4 and using back to back on the photocopier

Many students are turned off Physics because of the maths involved, yet you only need to be able to do ordinary level maths in order to answer all questions which will appear on the Junior Cert paper.

Some of these are in the new log-tables, but others are not so you should really try to remember all of them because it not always easy to identify the formula you need from the list in the log-tables. Practice looking for them in pages 51 – 56 (see the table at the bottom of page 2 for help).

The following are all the formulae which you need to know. The good news is that the question is very easy once you know which formula to use.

1.   **Area of a regular object = length × width**

2.   **Volume of a regular object = length × width × height**

3. $$\textbf{Density} = \frac{\textbf{Mass}}{\textbf{Volume}}$$

4. $$\textbf{Speed} = \frac{\textbf{distance travelled}}{\textbf{time taken}}$$

5. $$\textbf{Acceleration} = \frac{\textbf{change in velocity}}{\textbf{time taken}}$$

6.   **Weight (in newtons) = Mass (in kilograms) × 10**

7.   **The Moment of a force = the force × distance (between the force and the fulcrum).**

8. $$\textbf{Pressure} = \frac{\textbf{Force}}{\textbf{Area}}$$

9.   **Work done = Force × distance**

10. $$\textbf{Power} = \frac{\textbf{Energy}}{\textbf{time}} \qquad \textbf{or} \qquad \textbf{Power} = \frac{\textbf{Work}}{\textbf{Time}}$$

11.   **Voltage = Resistance × Current**

12.   **The number of kilowatt-hours equals the number of kilowatts multiplied by the number of hours**
                                            kWh = kW × hours

13. $$\textbf{slope of a graph} = \frac{\textbf{y}_2 - \textbf{y}_1}{\textbf{x}_2 - \textbf{x}_1}$$

Units
You must know the units of each of the quantities listed below.

Time	seconds	s
Distance	metres	m
Velocity / speed	metres per second	m/s
Acceleration	metres per second squared	m/s^2
Mass	kilograms	kg
Volume	metres cubed	m^3
Density	grams per centimetre cubed	g/cm^3
Weight	newtons	N
Force	newtons	N
Pressure	pascals	Pa
Work	joules	J
Energy	joules	J
Power	watts	W
Current	amps	A
Voltage	volts	V
Resistance	ohms	Ω

Test yourself –what formula connects the following variables?

				Page in log tables
mass	volume	density	**density = mass/volume**	**57**
velocity	time	distance		
change in velocity	acceleration	time taken		
× 10	mass	weight		
force	moment of a force	distance		
pressure	force	area		**57**
distance	force	work done		**55**
time	work	power		**55**
voltage	resistance	current		**61**
kW	hrs	kWhrs		
			Area =	
			Volume =	
			Slope of a line =	

Test yourself – complete the table below

Quantity	Unit	Symbol
Time	seconds	s
Distance		
Velocity / speed		
Acceleration		
Mass		
Volume		
Density		
Weight		
Force		
Pressure		
Work		
Energy		
Power		
Current		
Voltage		
Resistance		

Mass, Volume and Density

1. [2008 OL]
   If the mass of a stone is 20 g and the volume of the stone is 10 cm^3, find the density of the stone.

2. [2007 OL]
   A block of metal has the measurements shown on the right.
   The mass of the metal block is 21 g.
   (i) What is the volume of the block?
   (ii) What is the density of the block?
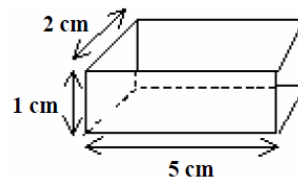
3. [2009 OL]
   The mass of a metal block is 14.7 g. It has a volume of 7 cm^3.
   Calculate the density of the block.
   Give the units of density with your answer.

4. [2009]
   A pupil measured the volume of a potato using the items of laboratory equipment, labelled A and B as shown in the diagram.
   The potato had mass 175 g and volume 125 cm^3.
   Calculate the density of the potato.
   Give the units of density with your answer.
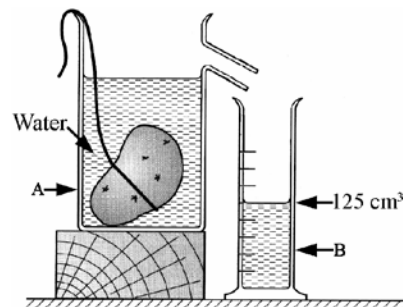
Solutions

1.
(i) Density = Mass ÷ Volume = 20 ÷ 10= 2 g/cm^3
2.
(i) Volume = 2 ×1 × 5 = 10 cm^3
(ii) Density = Mass ÷ Volume = 21 ÷ 10: 2.1 g/cm^3
3. Density = 14.7÷7 = 2.1 g/cm^3
4. Density = 175÷ 125 = 1.4 g/cm^3

Velocity and Acceleration

1. [2007 OL]
   The speed of a car is 15 m/s. What distance will the car will travel in 5 seconds?

2. [2009 OL]
(i) A cyclist moves 20 metres along a track in 4 seconds.
   Calculate the speed of the cyclist.
(ii) Calculate the distance the cyclist will travel in 2 seconds.

Solutions

1. Distance = speed × time = 15 × 5 = 75 m
2. Speed = distance ÷ time = 20 ÷ 4 = 5 m/s
   Distance = speed × time = 5 × 2 = 10 m

Force

1. [2009]
   A stone has a mass of 2 kg. What is the weight of the stone on earth? Give the unit.

Solution

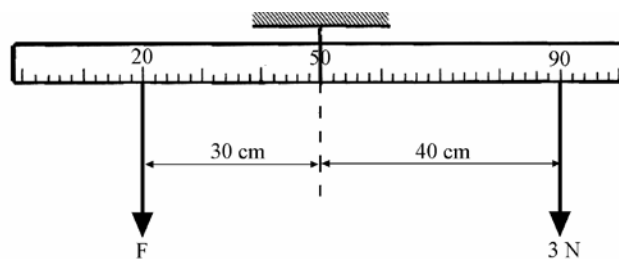1. Weight = mass × 10 = 2 × 10 = 20 Newtons.

4

Moment of a force

1. [2007]
   The diagram shows a metre stick suspended from its centre of gravity.
   A force of 3 N acts on the stick at the 90 cm mark and a force of F newtons acts on the stick at the 20 cm mark. The metre stick is balanced horizontally.
   Calculate force F.

Solution

1. Moment clockwise = moment anti-clockwise {and moment of a force = force × distance]
    $\Rightarrow$ 3×40 = $F \times 30$
    $\Rightarrow$ $120 = 30 \, F$
    $\Rightarrow$ $F = 120 \div 30$
    $\Rightarrow$ $F = 4 \, N$
    $\Rightarrow$

Pressure

1. [2006 OL]
   Give the formula for calculating pressure.

2. [2009 OL]
   Answer the following questions about pressure.
   A metal block applies a force of 20 N on an area of 5 cm^2. Find the pressure being applied by the block.

Solutions

1. Pressure = Force ÷ Area
2. Pressure = $20 \div 5 = 4$ Pa

Work, Energy and Power

1. [2007]
   The driver of a moving car applied the brakes.
   The brakes produced an average stopping force of 8 kN (8000 N) and the car stopped having travelled 20 m after the brakes were applied.
   Calculate the work done in stopping the car.

2. [2006]
   A girl of mass 60 kg (weight 600 N) climbed a 6 m high stairs in 15 seconds.
   Calculate the work she did and the average power she developed while climbing the stairs.

Solutions

1. Work (= force × distance) = $8000 \times 20 = 160000$ J
2. Work (= force × distance) = $600 \times 6 = 3600$ J.
   Power (= work ÷ time) = $3600/15 = 240$ W.

Electricity

1. [2006]
   Calculate the resistance of the filament of a car headlamp when 12 V produces a current of 5 A in it.
   In what unit is resistance measured?

2. [2007 OL]
   An electric cooker has four hot plates. The total power rating of the four hot plates is 7 kW.
   All four are used for a total of 2 hours each day.
(i) How many units of electricity (kWh) are used in 1 week?
(ii) If electricity costs 11 cent per unit how much does this cost?

5

3. [2006 OL]
   The ESB charges for electricity at a rate of 12 cent per kW h.
   A tumble drier of power rating 2.5 kW is used for 2 hours each week for 4 weeks.
(i) How many units of electricity are used?
(ii) What is the cost, in cent, of using the tumble drier?

Solutions
1. $R = V \div I = 12 \div 5 = 2.4$ Ohms (2.4 Ω)
2.
(i) $7 \times 2 \times 7 = 98$ units
(ii) $98 \times 11 = €10.78$
3.
(i) $2.5 \times 2 \times 4 = 20$ units.
(ii) $20 \times 12 = 240$ cent

Practice Questions

1. A stone has a mass of 120 g and a volume of 20 cm³, what is the density of the stone?

2. The density of Iron is 8 g/cm³. Calculate the mass of 6 cm³ of Iron.

3. What is the volume of an object which has a mass of 20 g and a density of 4 g/cm³?

4. Calculate the velocity of a swimmer who swims 100 m in 20 seconds.

5. Calculate the distance travelled by a teacher who runs at a speed of 5 m/s in for 3 s.

6. How long does it take a girl to travel 1000 m, if her speed is 2 m/s?

7. When a girl was a certain distance from a high cliff she shouted loudly. One and a half seconds later the echo returned from the cliff. How far was the girl from the cliff? (take the speed of sound to be 340 m/s).

8. What are the units of velocity?

9. One car can go from 0 to 100 m/s in 10 seconds while another car which can go from 100 m/s to 150 m/s in 3 seconds. Which car has the greater acceleration?

10. What are the units of acceleration?

11. Calculate the weight (in Newtons) of a bag of sugar, which has a mass of 5 kg.

12. A man has a mass of 100 kg. What is his weight?

13. Would the man weigh less or more on the moon?

14. Why does the man have a different weight on the moon?

15. A force of 75 N is used to turn the spanner in the diagram. If the distance between the force and the nut is 10 cm calculate the moment of the force.

Fulcrum
Force

16. A wrench 50 cm long is used by a mechanic to turn a nut.
If the force he exerts on the end is 4 Newtons, calculate the moment of the force.

17. A boy held a book of weight 20 Newtons in his fully outstretched hand, at a distance of 50 cm away. Calculate the moment of the force.

18. Beyonce weighs 500 N and is sitting at one end of a see-saw which is 4 m long and balanced in the middle. Jordan is 2000 N. Where should she sit in order to balance the see-saw?

19. If a metal block applies a force of 20 N on an area of 5 cm², find the pressure being applied by the block.

20. Calculate the area of the base of a wooden box, which weighs 48 newtons if the pressure exerted is 12 pascals.

21. A girl of mass 50 kg (weight 500 N) climbed a 7 m high stairs in 20 seconds.
Calculate the work she did and the average power she developed while climbing the stairs.

22. A force of 30 N was used to pull a sofa 4 metres across a room. How much work was done?

23. If the time taken in the previous question was 20 seconds, calculate the average power.
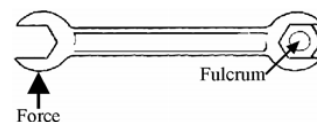
24. A weight-lifter lifted a weight of 1000 N a distance of 1.5 metres. How much work was done?

25. If the time taken in the previous question was 2 seconds, calculate the average power.

26. Complete the table below

Voltage	Current	Resistance
10	5	
	2	200
120		30
100	2	
	0.5	20
120		10

27. The ESB charges for electricity at a rate of 11 cent per kW h.
   A hair-drier of power rating 1.5 kW is used for 20 minutes each day.
(i) How many units of electricity are used?
(ii) What is the cost, in cent, of using the hair- drier for six days?

Watts (W)	kilowatts (kW)	Hours (Hr)	kWhr	Cost (12 cent per unit)
50	0.05	60	3	24
20		5		
1000		1 day		
500		10 minutes		
60		1 week		