. DISTRICT PUBLIC SCHOOL & COLLEGE, KASUR

NOTES/HOME TASK/WORK SHEET FOR

CLASS: **8th**

SUBJECT: **G. SCIENCE**

2nd TERM SYLLABUS: **UNIT (9,10,11,12)**

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Unit # 9
Lenses at work

Answers to Exercises in Unit 9

1. (a) Draw a convex lens and mark the following points on it. Optical centre, principal axis principal focus.

Ans. Please see Pupil's Book.

(b) Explain the difference between a real and a virtual image.

Ans. A real image can be made on a screen. An image that cannot be formed on a screen is called a virtual image, e.g. an image formed by a convex lens is real. An image formed by a concave lens is virtual.

(c) Draw rays on the diagram to show how a concave lens can produce a virtual image.

Ans. Individual work

(d) Draw rays on the diagram to show how a real image can be formed by a convex lens.

Ans. Individual work

(**e) When is a person said to be suffering from long-sightedness? Draw a diagram of the eye to show how this defect may be corrected by the use of a suitable type of lens.**

Ans. A person suffers from long-sightedness when in his eyes the distance between the lens and the retina is shorter than normal. Distant objects can be focused properly, but the point of focus for an object close to the eye is behind the retina. [Pupils to draw the diagram]

Unit # 10

Force and pressure

Answers to Exercises in Unit 10

1. (a) Define the term pressure. How is pressure measured in the SI system of units?

Ans. Scientists use the word pressure to describe how concentrated a force is. Pressure can be defined as the force exerted per unit area. If force is measured in newtons (N) and area in square metres, then pressure is measured in newtons per square metre (N/m^2).

A pressure of 1 N/m^2 is also called 1 pascal (Pa).

If force is measured in newtons (N) and area in square metres, then pressure is measured in newtons per square metre (N/m^2)

A pressure of 1 N/m^2 is also called 1 pascal (Pa).

b) Explain how the pressure exerted on the surface of a rectangular block depends

ans. If a force is concentrated on a small area it creates a high pressure. If the same force is spread over a larger area, its effect is less concentrated. The pressure is less. For example, a box has the same weight (200 N) no matter which way it is resting on the floor. However the pressure on the floor will change, depending on which side of the box is in contact with it.

(c) The base of a rectangular vessel measures 10 cm x 18 cm. water is poured in to a depth of 4 cm. what is the pressure on the base?

Ans. density of water is 1000 kg/m
pressure = density x depth x g = 1000 x 4 x 10 = 40,000 Pa

(d) On what does the pressure in liquids depend?

Ans. The size of the force (measured in newtons)
The area of the surface it is pressing on (measured in square metres).

(e) Explain the difference between force and pressure.

Ans. pressure = force / area
If force is measured in newtons (N) and area in square metres, then pressure is measured in newtons per square metre (N/m^2)

(f) In what ways is the pressure in gases the same as the pressure in liquids. How is it different?

Ans. A gas behaves like a liquid in some ways. Its pressure acts in all directions. Its pressure decreases as you rise up through it. However, unlike a liquid, gases can be compressed.

(g) Why does the pressure in gases rise when they are compressed?

Ans. Gases can be compressed. This means that it is easier to stop a gas expanding than a liquid or a solid. But if a gas is enclosed in a sealed container, and is not allowed to expand, its pressure rises. This is because the molecules in a gas are always moving. They travel very fast, hitting each other and the sides of the container. If the temperature rises, the molecules move faster, and the pressure rises.

(h) Describe a siphon and explain how it works.

Ans. The siphon is a bent tube made of glass, rubber, or plastic, with its short arm dipping in the tank and its longer arm outside. To start the siphon it must first be filled with liquid. After this, the liquid will continue to run out as long as the end of the longer arm of the tube is below the level of the water in the tank. A siphon is used to remove water from a fish tank or other vessels, which cannot otherwise be easily emptied. It is generally thought that a siphon works by atmospheric pressure.

2. State two factors on which the pressure in a liquid depends.

Ans. The pressure of a liquid increases with depth and the density of the liquid petrol is less dense than water, so a container of petrol will exert less pressure than the same container full of water.

3. Describe an experiment to prove that air exerts pressure.

Ans. Experiment to prove that air exerts pressure:
Moisten a rubber sucker and press it on a smooth flat surface. Air is squeezed out from beneath it. The sucker is held tightly to the surface due to atmospheric pressure.

4. **How would you show by an experiment that the pressure at a given point in a liquid is the same in all directions?**

Ans. The transmission of pressure in fluids can be demonstrated by a simple apparatus which consists of a bulb with small holes on all sides and a tightly fitted plunger. Fill the bulb with water and push the plunger. Water squirts equally from all the holes.

Unit # 11
Expansion of solids and liquids

Answers to Exercises in Unit 11

1. Why do most solid expand on heating?

Ans. Substances expand when heated. When we heat a solid its molecules vibrate more rapidly. The vibrations take up more space. The molecules push each other further apart.

2. How can you prove by an experiment that metals expand at different rates on heating?

Ans. When rods of the same length but of different substances are heated through the same range of temperature, their expansions are not equal. Brass, for example, expands about one and a half times as much as steel. Aluminium expands twice as much as steel. An alloy of steel and nickel known as invar expands very little when its temperature rises.

3. What is a thermostat and what is it used for?

Ans. The bimetallic strip has many useful applications, one of which is the electric thermostat, which is a device for maintaining a steady temperature. The principle of a thermostat is used for controlling the temperature of a room warmed by an electric heater. Thermostats are also used to control the temperature of laundry irons, hot-water storage tanks, and fish aquaria.

4. What happens to liquids when they are heated?

Ans. Most liquids expand when heated, and they expand much more than solids.

5. How is the behavior of water different from other liquids when it is heated from 0 to 4 degrees Celsius?

Ans. Water behaves in a very unusual way when heated from 0 degrees Celsius. As its temperature rises from 0 to 4 degrees Celsius it actually contracts. However, from 4 degrees upwards it expands like any other liquid. This means that water takes up least space at 4 degrees Celsius. It has its greatest density at this temperature, and will sink through warmer or colder water around it.

6. Differentiate between the latent heat of vaporization and latent heat of fusion.

Ans. The heat energy absorbed when a liquid changes into a gas is called latent heat of vaporization. The energy is needed to pull the molecules apart so that they can move around freely as gas. The heat absorbed when a solid melts is called latent heat of fusion. Just as latent heat is taken in when water changes to vapour at the same temperature, heat is taken in when ice melts to form water as well. But in this case the latent heat is not so high.

7. How does evaporation cause cooling?

Ans. To change from liquid to vapour, the liquid requires latent heat which it takes from a warm surface. The warm surface loses heat and cools down.

8. if pressure is applied, what happens to the melting point of a solid that

(a) expands when heated?

Ans. Its melting point is lowered.

(b) contracts when heated?

Ans. Its melting point is raised.

Unit # 12

Electricity and magnetism

Answers to Exercises in Unit 12

1. (a) What is electromagnetism? When esa electromagnetism first eiscovered?

Ans. In 1820, Oersted, a scientist from Denmark, showed that if a compass was placed below a wire carrying an electric current, the compass needle moved. This showed that a wire carrying an electric current has a magnetic field around it. This is called electromagnetism.

(b) Where is the magnetic field of an electromagnet the strongest?

Ans. The magnetic field is strongest close to the wire.

(c) What is a solenoid? How can we find the direction of the field of a solenoid?

Ans. When a current flows in a long coil of wire with many loops, the magnetic field looks just like that of a bar magnet. A coil like this is called a solenoid. The direction of the field of a solenoid can be found by using the fingers of your right hand to show the direction of the current in the loops of wire. Your right hand thumb shows the north pole of the solenoid.

(d) How does a bicycle dynamo generate electricity?

Ans. A current is produced when a wire is moved through a magnetic field. This is called the dynamo effect. It is just the opposite of the motor effect. The bicycle dynamo is an electrical generator**.** The energy which generates electricity in a bicycle dynamo comes from the cyclist. The food that the cyclist eats supplies the energy to turn the wheel which turns the magnet inside the coil of wire! When the magnet is lined up with the iron core there is a strong magnetic field in the coil of wire. As the magnet turns, the field gets weaker. It then gets stronger again but in the opposite direction. It is this changing magnetic field inside the coil which provides a voltage at the dynamo's terminals. The size of the voltage produced by the dynamo depends on the speed of the spinning magnet. As it spins faster the voltage increases so the light of the bicycle gets brighter. When the bicycle stops, the dynamo does not generate any electricity and the lights go out.

(e) How is electricity generated at na power station?

Ans. In power stations fuel such as coal, gas, oil, or energy from a nuclear reactor is used to heat water and turn it into steam. The steam then turns turbines connected to a.c. generators. These are called alternators. They work on the same principle as the bicycle dynamo. The voltage is produced by a magnet spinning inside fixed coils of wire. The power station uses a spinning electromagnet. By changing the current in the electromagnet the output from the alternator can be accurately controlled without slowing the turbines. The current for the electromagnet comes from a small d.c. generator which is also driven by the turbines.

(f) Name some output components and write their uses.

Ans. Output components and their uses:
Calculators: these devices use electronic circuits to solve mathematical problems quickly and accurately. Digital clocks: these devices use electronic timing circuits. These timers can be used in other devices. Central heating control units: these devices use programmable electronic circuits to allow easy control and are more reliable than mechanical switches. Computers: these devices are used for solving mathematical problems, business purposes and games. Electronic organs: these devices use electronic circuits to produce musical notes and rhythms. Satellite communications: these devices are used for international communications, military purposes, and satellite television.

Unit # 13

Modern technology and space travel

Answers to Exercises in Unit 13

1. (a) What is telecommunication? Name various modes of telecommunication in use today.

Ans. Sending and receiving messages over long distances is called telecommunication. The various modes of telecommunication used nowadays are: radio, television, satellite, wireless, telegraph, telephone, fax, and electronic mail.

(b) What invention marked the beginning of modern telecommunication?

Ans. The invention of the telegraph in the 1850s marked the beginning of modern telecommunication.

(c) How is sound carried from one telephone to another?

Ans. When you speak in the mouthpiece of a telephone, the sound waves of your voice make the diaphragm vibrate very fast. As the diaphragm moves inwards it pushes the carbon granules behind the plate close together. This allows an electric current to flow through the carbon granules easily. As the diaphragm moves outwards, the electric current becomes weaker. These changes in the electric current make the current flow to the earpiece of another telephone along a wire, where the above procedure is reversed and the sound waves can be heard.

(d) What are radio waves? How are sound waves carried nfrom the radio station to our radio sets?

Ans. Radio waves are electric signals that can travel over long distances through empty space. They travel at the speed of light (300,000 kilometres per second). At the radio station there is a transmitter, which is connected to an aerial. The transmitter makes a radio signal which the aerial sends out. The main part of the radio signal is called the carrier wave. As radio waves travel away from the transmitter, they grow weaker. They are made stronger by the amplifier in the receiver's radio set.

(e) How do we see pictures on our television sets?

Ans. A television camera turns light and sound waves into electric signals. It scans the pictures which appear on our television screen. The television aerial receives radio waves from the transmitter, which are turned into electric signals. A tuner selects a signal, which is then split into sound and picture signals.

(f) What is laser light?

Ans. A laser light is a concentrated beam of light which can travel long distances. It can also travel down glass tubes, carrying messages from one place to another.

(g) What is an optical fibre?

Ans. The thin glass tubes which carry laser light are called optical fibres. They can carry more messages than a wire.

(h) What is a computer? Describe the components of a computer system.

Ans. A computer is a machine that can be used to do many different types of work. A computer is part of a computer system which needs an input device such as a keyboard or mouse, with which we can feed in data and programmes, and an output device or monitor which gives us the results on a screen.

(i) How is nuclear energy produced? Describe a nuclear reactor.

Ans. Nuclear energy is produced by nuclear fission. The nucleus of an atom of a metal called uranium can be split into two. Some of its neutrons escape and crash into other uranium atoms, causing them to split. This splitting process releases huge amounts of energy. A nuclear reactor: controlled nuclear fission is done in a special container called a nuclear reactor. Uranium is packed in stainless steel tubes. Inside the reactor there are a large number of fast moving neutrons which are absorbed by the uranium atoms and their nuclei are split to release energy. The heat given out during fission is carried away by a cooling fluid called coolant. The coolant becomes hot and is used to produce steam in a boiler. The steam is used to generate electricity in a generator.

2. Fill in the blanks.

Ans. (a) communication (b) electricity (c) 1850s
(d) Alexander Graham Bell; 1876 (e) diaphragm
(f) Guglielmo Marconi; 1895 (g) carrier wave (h) television
(i) phosphor (j) nuclear reactor

3 Write short notes on the following.

Ans. **Rocket fuel:** Nowadays, space rockets use liquid oxygen as fuel. Most of the space inside the rocket is taken up by two storage tanks: one for the fuel and the other for the oxidizer. The fuel and the oxidizer are pumped into a combustion chamber, where they are set alight. The hot gases produced shoot backwards out of the tail nozzle and the rocket shoots forwards.

Spacesuits. Astronauts wear special clothes called spacesuits which are made of several layers of materials to protect them when they space walk. The outer layers protect them from flying particles. Oxygen for breathing is fed into the inner layer. The white surface reflects sunlight. Water flows through pipes in the suit to keep the astronaut cool. The backpack holds the oxygen supply as well as a radio with batteries.

Life support system: The spacecraft has a life support system which provides the astronauts with air, food, and water.

Mission control: The main communication centre for human flights in space is called the mission control, by which astronauts keep in contact with scientists on Earth.

Re-entry: The return of the spacecraft back to Earth is called re-entry. It is the most dangerous time for the astronauts. There is friction between the air and the spacecraft as it re-enters the atmosphere. The spacecraft is protected by a thick heat shield which prevents it from burning up.

Unit # 9
Lenses at work

MCQs

(1) A lens can light.				
refract	reflect	break	distort	[***refract***]
(2) lenses curve outwards.				
Concave	Flat	Plastic	Convex	[***Convex***]
(3) Concave lenses curve .				
backwards	outwards	inwards	sideways	[***inwards***]
(4) The central point of a lens is called the focus.				
teacher	tutor	principal	main	[***principal***]
(5) The image formed by a lens is real.				
convex	flat	concave	plastic	[***convex***]
(6) Shortsight is corrected by wearing lenses.				
plastic	diverging	converging	flat	[***diverging***]
(7) The regulates the amount of light entering the eye.				
iris	cornea	lens	retina	[***iris***]
(8) A film camera uses a lens.				
concave	convex	prism	magnifying	[***convex***]
(9) A projector uses convex lenses.				
one	two	three	no	[***two***]
(10) In people, the point of clear focus is somewhere behind the retina.				
long-sighted	short-sighted	[***long-sighted***]		

Unit # 10

Force and pressure

MCQs

(1) Pressure describes how concentrated the is.				
weight	force	volume	mass	[***force***]
(2) the load reduces pressure.				
Spreading	Mixing	Diluting	Rubbing	[***Spreading***]
(3) Pressure is affected by the of the liquid.				
opacity	density	weight	colour	[***density***]
(4) under pressure pushes on every surface it touches.				
Solid	Gas	Liquid		[***Liquid***]
(5) A siphon works by pressure.				
Container	Water	solid	Atmospheric	**Atmospheric**
(6) In a siphon, the liquid will continue to run out as long as the end of the longer arm of the tube is the level of the water in the tank.				
alongside	above	below	[***below***]	
(7) Unlike a liquid, can be compressed.				
(8) If force is concentrated on a small area, it creates a pressure.				
Low	Normal	High	**High**	
(9) is equal to pressure multiplied by area.				
Force	Weight	Mass	**Force**	
(10) An aerosol demonstrates how gases and liquids behave under				
Burnen	Weight	Pressure	**pressure**	

Unit # 11

Expansion of solids and liquids

MCQs

(1) Water when its temperature rises from 0 to 4°C.				
expands	contracts	boils	evaporates	[***contract***s]
(2) As a gas expands, the distance between the molecules grows and its volume .				
increases	decreases	freezes	[***increases***]	
(3) Overhead electric wires are kept loose because they can break in very cold weather due to				
Expansion	Current	Contraction	Contraction	
(4) When spirit evaporates from hand a cooling sensation is felt. This happens because ……..heat is taken from the hand which loses heat and cools down.				
thermal	useful	latent	Latent	
(5) When paraffin wax solidifies, it .				
breaks	expands	contracts	**Contracts**	
(6) When water freezes, it .				
expands	evaporates	Contracts	Expands	
(7) A thermostat is a device used for maintaining a steady .				
volume	quantity	temperature	Temperature	
(8) Relegation is a factor in the making of .				
Snowball	Ice	Vapours	**Snowballs**	

Unit # 12

MCQs

(1) A solenoid is a long coil of wire with many .				
threads	magnets	loops	colours	[***loops***]
(2) The motor effect has been used by engineers to build electrical .				
motors	engines	cars	machines	[***motors***]
(3) A magnet moving near a coil of wire induces a .				
solenoid	dynamo	voltage	[***voltage***]	
(4) The bicycle is an electrical generator.				
handle	light	dynamo	gear	[***dynamo***]
(5) Homes take their power at volts.				
240	303	420	440	**240**
(6) Alternating voltage currents can be increased or decreased easily using .				
pylons	solenoids	transformers	generators	[***transformers***]
(7) At a power station water is heated to make which turns turbines.				
current	generator	transformer	steam	[***steam***]
(8) The effect is the force which makes a wire move when an electric current flows in it.				
Motor	Engine	Strong	Current	motor
(9) The effect is the force which is produced when a wire is moved in a magneticfield.				
motor	dynamo	solenoid	generator	[***dynamo***]
(10) The electricity generated by power stations is distributed through a large network of cables called				
direct current	optic fibre	National Grid	power turbines	[***National Grid***]

Unit 9: Lenses at work Worksheet 1

Name: _____ Date: _____

1. Write the names of the lenses shown below.

_____ _____ _____ _____

2. Draw diagrams to show how rays are refracted by a lens.

Unit 9: Lenses at work Worksheet 2

Name: _____ Date: _____

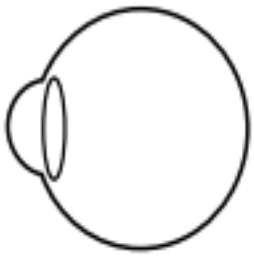
1. Match the optical instrument to its name:

	Description of the optical instrument	Name
a.	used for showing slides on a screen; it consists of two convex lenses	the human eye
b.	used for taking photographs of objects; it has a convex lens which focuses the image on the film, coated with light-sensitive chemicals	a film projector
c.	takes still and video photographs by recording images using an electronic imaging sensor	a microscope
d.	a simple convex lens which has a short focal length; it produces an erect, magnified, and virtual image of the object	a film camera
e.	used for studying very tiny objects; has two convex lenses; a magnified, clear image of the object is seen by it	a telescope
f.	used for studying heavenly bodies; consists of two convex lenses; rays coming from a heavenly body form a real, inverted, and small image of the object	a magnifying glass
g.	It is like a camera in the human body. It has a convex lens which forms an inverted image of any object on a screen made up of light-sensitive cells, which send messages to the brain through the optic nerve. The brain produces an upright image of the object.	a digital camera

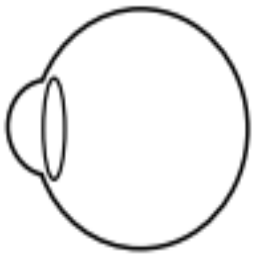
Unit 9: Lenses at work Worksheet 3

Name: _____ Date: _____

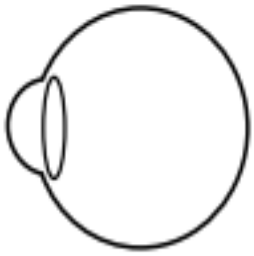
1. (a) Draw rays to show the kind of defect in short-sightedness:



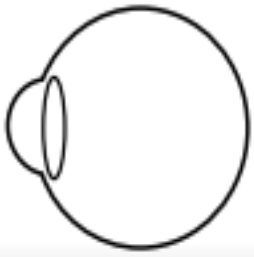
(b) Draw rays on the diagram to show how a lens can be used for its correction:



2. (a) Draw rays to show the kind of defect in long-sightedness:



(b) Draw rays on the diagram to show how a lens can be used for its correction.

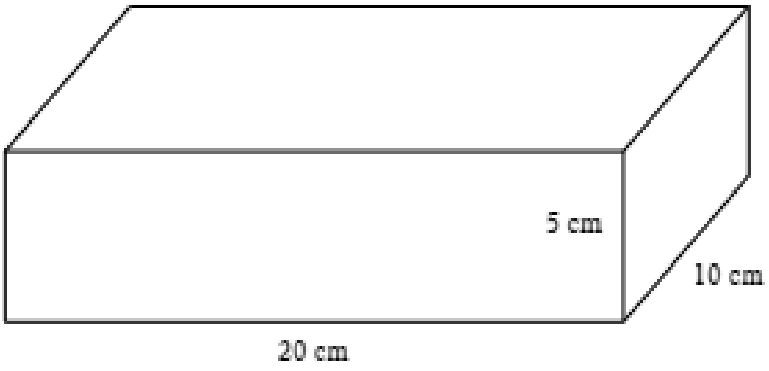


Unit 10: Force and pressure Worksheet 1

Name: _____ Date: _____

1. Fill in the blanks to describe pressure:
   a. Scientists use the word pressure to describe how _____ a force is.
   b. Pressure can be defined as the _____ exerted per unit area.
   c. If a force is concentrated on a small area, it creates a _____ pressure.
   d. If the same force is spread over a larger area, its pressure is _____.
   e. To calculate the size of pressure we can use the formula:

      pressure = _____ / _____
   f. A pressure of 1 pascal is equal to _____.
   g. A concrete floor can withstand a pressure of _____.
   h. Soft sand can only support a pressure of _____
2. Calculate the pressure of the box when it is lying on its:



   a. base _____
   b. side _____
   c. back _____
   d. In which position does the box exert the greatest pressure? _____

Unit 10: Force and pressure Worksheet 2

Name: _____ Date: _____

1. Underline the correct word(s) to describe atmospheric pressure:

   a. The Earth's atmosphere contains billion of tons of water vapour / air.

   b. At sea level, atmospheric pressure is equivalent to a force of about 100,000 newtons pushing on every square centimeter / square metre.

   c. The atmosphere behaves like a solid / liquid in some ways.

   d. Air pressure acts in all ways / directions.

   e. Air pressure decreases / increases as you rise up through it.

   f. Unlike a liquid, air can be depressed / compressed.

   g. The molecules of a gas are always moving / slowing down.

   h. If a gas is enclosed in a sealed container and is not allowed to expand / contract, its pressure rises.

   i The pressure in a gas is caused by the fast moving / slow moving molecules colliding with the sides of the container.

   j. If a gas is compressed into a smaller space, the molecules become more diluted / concentrated.

Unit 11: Expansion of solids and liquids Worksheet 1

Name: _____ Date: _____

1. Write short answers to the following questions:

i. What is expansion?

_____

_____

_____

ii. Why do substances expand on heating?

_____

_____

_____

iii. What is invar?

_____

_____

_____

iv. Which expands more, brass or steel?

_____

_____

_____

v. What is a thermostat?

_____

_____

_____

Unit 11: Expansion of solids and liquids Worksheet 2

Name: _____ Date: _____

1. Fill in the blanks to explain how the expansion of water is different from other liquids.

   Water behaves in a very _____ way when it is heated from 0°C.

   As its temperature rises from 0 to 4°C, it actually _____. However,

   from 4°C upwards, it _____ like any other liquid. This means that water takes

   up least _____ at 4°C. It has the greatest _____ at this temperature,

   and will _____ through warmer or colder water around it.

   As soon as the water on the surface of a lake cools to 0°C, it _____ to the bottom.

   Even if the lake freezes over, water at the bottom can still be at _____.

   Fish can _____ a severe winter by staying in this deeper, warmer water.

2. Write the name of the term:

Description	Term
i. the heat energy that is absorbed when a liquid changes into a gas	_____
ii. the heat that is absorbed when a solid melts	_____
iii. the change from a liquid to a vapour	_____
iv. the effect of pressure on the melting point of ice and its refreezing	_____

Unit 12: Electricity and magnetism Worksheet 1

Name: _____ Date: _____

1. Fill in the blanks to explain the results of Oersted's experiments:

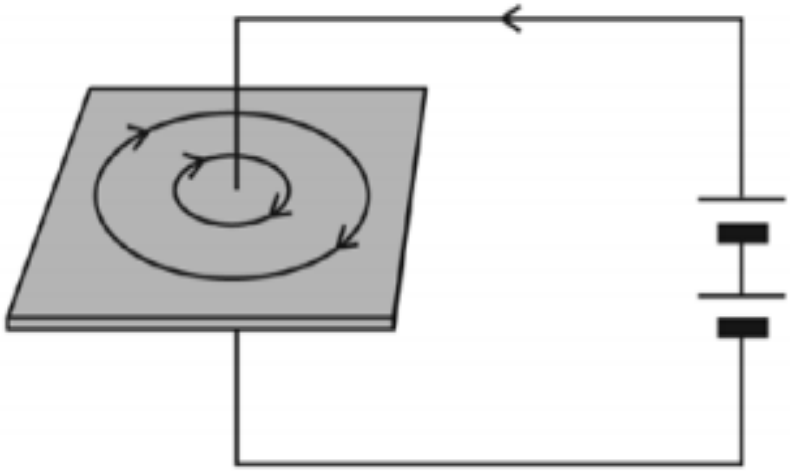
   a. The magnetic lines of force are in _____ around the wire.

   b. The direction of the magnetic field is _____ if we look at the direction of the flow of the current from + to -.

   c. If the direction of the current is reversed, the _____ also reverses.

   d. The magnetic field becomes _____ as the size of the current increases.

   e. The magnetic field is _____ close to the wire.



Unit 12: Electricity and magnetism Worksheet 2

Name: _____ Date: _____

Write the terms for these descriptions:

Description	Term
a. the force produced when an electric current flows in a wire in a magnetic field	_____
b. the current generated by a magnet moving near a coil of wire	_____
c. the current produced when a wire is moved through a magnetic field	_____
d. a device which uses electronic circuits to solve mathematical problems quickly and accurately	_____
e. a device that uses electronic timing circuits	_____
f. a device that uses electronic circuits to produce musical notes	_____
g. a device used for international communication in space	_____
h. the kind of plant used to generate electricity using the power of water	_____

2. Match the problems of electricity generation with the sources:

Sources of power generation	Problems
a. using fossil fuels	do not need reservoirs to store water, and do not create pollution, but their construction costs are high
b. hydroelectric power plants	are relatively expensive and do not work at night or in bad weather
c. wind turbines	They are not renewable. They took millions of years to make, and at some point in time will run out. They can cause serious environmental problems.
d. solar panels	use a reservoir to store water, due to which lots of land is submerged; dams which are built to store water, displace people and destroy wild life; dam bursts can be disastrous