# SCIENCE 10F
# ELECTRICITY TEST REVIEW

The test date is _____.

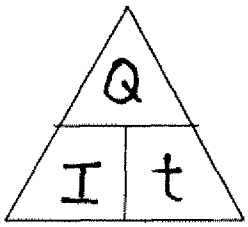
**Know the meanings and uses of each of the following:**

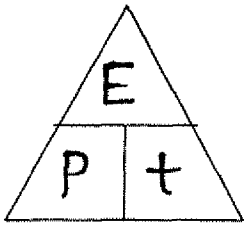
| | | |
|---|---|---|
| Static electricity | Positive | Negative |
| Neutral | Attract | Repel |
| Opposite | Like | Electrons |
| Protons | One-Fluid Model | Two-Fluid Model |
| Particle Theory Model | Friction | Contact |
| Electrostatic Series | Induction | Discharging/Grounding |
| Current Electricity | Dry Cell | Battery |
| Load | Circuit | Amperes |
| I = Q/t | Conductor | Insulator |
| Electric Potential | Voltage | Charge |
| Coulombs | Energy | Joules |
| Power | Watts | Resistance |
| Ohm (Ω) | Primary Battery/Cell | Secondary Battery/Cell |
| Series Circuit | Parallel Circuit | P = E/t |
| V = E/q | Kilowatt hours | Cost = Ptr |
| Switch | Wire | |

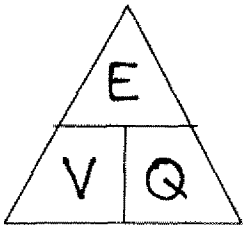
**Important Stuff** (this will be provided to you for your test):

**ELECTROSTATIC SERIES**

\+
Acetate
Glass
Wool
Fur or hair
Silk
Aluminum
Cotton
Wax
Plastic
Rubber
Gold
\-



**Some example questions:**

1) State the law of electric charges.

- opp attract - neutral + charged attract
- Same repel

2) What is the One-Fluid Model of static electricity? The Two-Fluid Model? The Particle Model? Which one do we still believe today?

1 - electricity a negatively charged fluid that moves between objects

2 - +'ve and -'ve fluid moving b/w objects

3) Which part of the atom moves to create static electricity? What is the charge on that part?

- electron

negative

4) (You will be given an electrostatic series). If a wool sock and a fur coat are dried together in a clothes dryer, which one will end up with a positive charge? Which one will end up with a negative charge? How do you know?

Wool + -wool higher on electrostatic series

fur -

5) What are the two main factors that affect how much static electricity is created when you rub to objects together?

- length - humidity
- type on objects

6) What are some differences between charging by friction and charging by induction?

friction - objects make contact and move, electrons jump from 1 object to the next

induction - objects don't touch or move, electrons shift

7) What is grounding an object? What happens when an object is grounded?

- object touches the ground
- electrons shift so object is neutral

8) What is current electricity?

-electrons that move usually through a circuit

9) What is a Coulomb? What is it used to measure?

-is $6.0 \times 10^{18}$ electrons

- measures charge

10) What is a conductor? What is an insulator? Name two things that are examples of each.

- conductor object that alows electrons to flow through it ie copper
- insulator does not alow electrons to move wool, rubber

11) How do each of the following affect the resistance of a circuit:

a. Cross-sectional Area (thickness) of the wire

- Smaller cross-section more resistance

b. Type of wire

- Substance like copper has less resistance than nicrome

c. Length of wire

- longer more resistance

12) What is a short circuit? How is a short circuit created? Why is a short circuit dangerous?

- Circuit without a load, if a battery is connected + to - end
- can cause heat

13) In which direction does current flow from a battery?

negative to positive

14) Describe the difference between:

a) a cell and a battery.

- cell is 1 electrolyte and 2 electrodes
- battery is a collection of cells in series

b) an open and a closed circuit

- open circuit electrons flow
- closed electrons don't flow

c) primary and secondary cell

primary single use

Secondary rechargable

15) Fill in the following table

| | Description | Formula | Symbol | Unit |
|---|---|---|---|---|
| Electric Current | amount of charge in a second | $I = Q/t$ | I | A |
| Electric potential | The potential energy each electron has | $V = IR$ | V | V |
| Resistance | friction in a wire | $I = V/R$ | R | Ω |
| Charge | $6.0 \times 10^{18}$ electrons | $Q = It$ or $Q = E/V$ | Q | C |
| Power | the amount of energy per second | $P = E/T$ | P | W |
| Energy | the amount of J each C has | $E = V \times Q$ <br> $E = P \times t$ | E | J |

16) What is a series circuit? How many paths for an electron to take are there in a series circuit?

- series circuit has only one path for electrons.
- electrical devices share the electrical pressure

17) How is a series circuit different from a parallel circuit?

- if one load goes out (doesn't work) the rest do to. The more loads the less energy each one has.

18) If you create a circuit with two bulbs in series and a different circuit with two bulbs in parallel, and all other things are the same, which bulbs will be brighter? Why?

Parallel brighter, not sharing energy

19) Draw the following electrical symbols:

a. Open switch

b. Closed switch

c. One dry cell

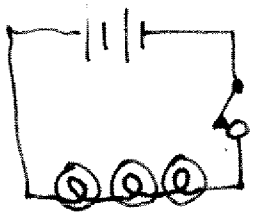
d. Battery

e. Wire

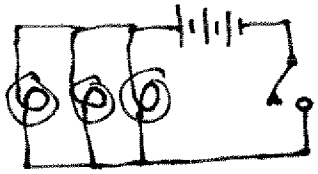
f. Light bulb

20) Draw the following circuits:

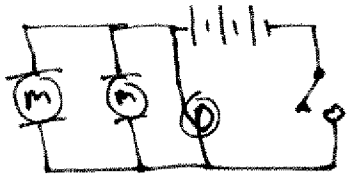
a. Two dry cells, one closed switch, three light bulbs connected in series



b. One battery, one open switch, three light bulbs connected in parallel



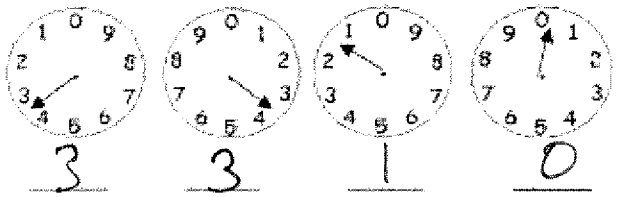
c. A complete parallel circuit with a battery, a switch, and three loads



21) What is power? What is the symbol for power? What unit is used for power?

22)

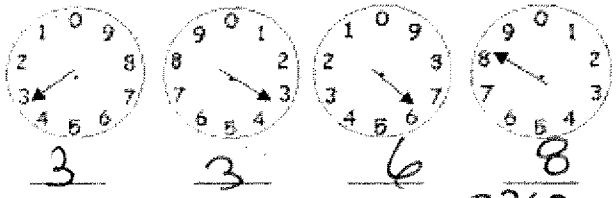
1a)



3 3 1 0 X 10

b) How many kWh does the above reading represent? 33100 kWh

2a) One month later, the meter in question 1a shows the following reading.



3 3 6 8 X 10

b) How many kWh does the above reading represent? 33680 kWh

c) How many kWh were used during one month? 580
(1b reading - 1a reading)

d) If electricity costs six cents per kWh, calculate the billed amount for this customer. $ 34.80

# Electricity Calculation Questions

Use the following formulas to answer questions 21- 32

$I = \frac{Q}{t}$ current = $\frac{\text{charge moving past a point}}{\text{time}}$

$V = \frac{E}{Q}$ electric potential = $\frac{\text{energy (**joules J**)}}{\text{charge (**coulombs C**)}}$

$P = \frac{E}{t}$ power = $\frac{\text{energy}}{\text{time}}$

Cost = Power(kW) x time (h) x rate ($)

23. Calculate the cost of running a coffee maker that has a power rating of 0.850kW and operates for 3 hours. (rate is $0.08/ kW·h)

Cost = 0.850kW x 3hrs x $0.08 =

$0.20

24. If your toaster takes 15 seconds and has a current of 7.5 A, how much charge does it take to toast two pieces of toast?

$I = \frac{Q}{t}$ $Q = It$ $Q = 7.5A \times 15s =$ 112.5C

t = 15s

I = 7.5V

Q = x

25. If a 705J battery is used over 5.0 minutes, what is the power produced?

$E = 705J$

$t = 5.0 min \times 60s = 300s$

$P = \frac{E}{t} = \frac{705J}{300s} = 2.35W$

26. What is the potential difference in a battery if the charge is 65C and 275 J of energy are used?

$Q = 65C$

$E = 275J$

$Q = \frac{E}{V}$

$V = \frac{E}{Q} = \frac{275J}{65C} = \boxed{4.23V}$

27. How long would it take for a electric kettle with a current of 15 amps to use a charge of 58 C?

$I = 15A$

$Q = 58C$

$I = \frac{Q}{t}$

$t = \frac{Q}{I} = \frac{58C}{15A} = \boxed{3.87s}$

28. How long would it take a 100watt bulb to use 4500J?

$P = 100W$

$E = 4500J$

$P = \frac{E}{t}$

$t = \frac{E}{P} = \frac{4500J}{100W} =$

$\boxed{45s}$

29. If a 9 V battery has a charge of 65C how much chemical energy does the battery have?

$V = 9V$

$Q = 65C$

$V = \frac{E}{Q}$

$E = VQ = 9V \times 65C = \boxed{585J}$