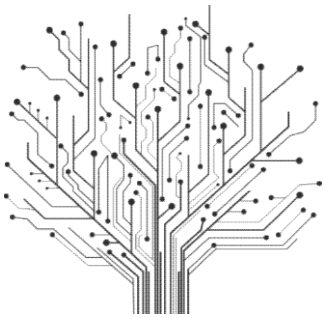
Name: Class:

Total Possible Marks: 23

Circuits Current and PD



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1. Match the circuit symbol with its short description:

a. c LED (light emitting diode)

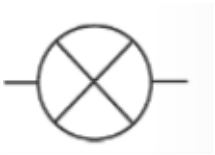
b. d Diode

c. e LDR (light dependent resistor)

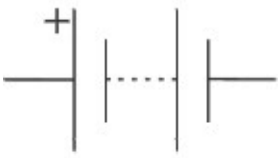
d. a Filament lamp (or bulb)

e. b Battery

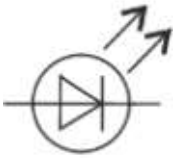
a.



b.

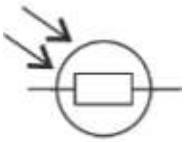


c.



d.

e.



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2. An electric (a) current is a (b) flow of electric (c) charge. (d) Cells (and other power supplies) always have a (e) positive terminal (the (f) longer line) and a (g) negative terminal (the (h) shorter line). Current (i) flows from positive to negative (j) around a circuit.

* Current actually flows from negative to positive, the positive to negative suggestion is a scientifically accepted convention

charge *shorter* *positive* *around* *Cells* *longer*
flows *flow* *current* *negative*

1

3. Look at the statements which follow, and decide whether or not the statement is true or false.

a. (T) (F) A voltmeter measures current. It is always connected across a component, this is known as "connected in parallel". * voltmeter measures potential difference not current

b. (T) (F) An ammeter measures current. It is always connected in line with a component, this is known as being "connected in series. * This is correct

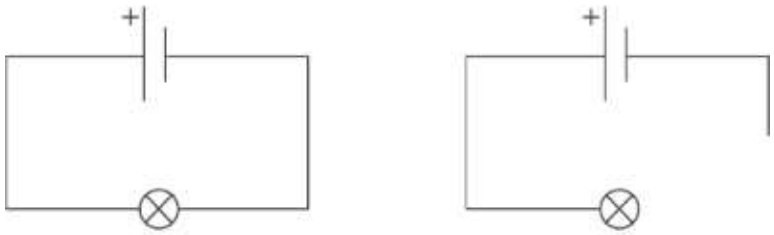
c. (T) (F) Potential difference is a measure of the rate of flow of charge. * The size of the current is the rate of flow of charge, measured in amperes, potential difference is measured in volts

d. (T) (F) Electrical charge will only flow around a complete circuit if there is a potential difference. * This is correct

e. (T) (F) Potential difference is the "driving force" which pushes the charge around the circuit, it is measured in amperes. * Potential difference is measured in volts not amperes

1

4.



The diagram shows two circuits. In one of the circuits the filament bulb will be lit and in the other it will not be. In a few lines explain why this is.

A circuit is only complete if you can follow a wire from one end of the battery, or other power supply, through any components to the other end of the battery. Any breakages in the circuit will cause it to become incomplete, and it will not do its job. The left-hand circuit is complete all the wires are joined and the lamp will light up, however the right-hand circuit is broken and the lamp will therefore not light.

___ 6

5. The electric current is a flow of electric charge. The size of the current is the rate of flow of charge and is measured in amperes (or amps) denoted A. When current flows past a point in the circuit for a length of time, and the charge that is passed is given by the formula:

$$Q = I \times t$$

Where Q is the charge flow in Coulomb
t is the time in seconds
I current in amperes

___ 2 a. A battery charger passes a current of 2.5 A through a cell over a period of exactly 4 hours. How much charge does the charger transfer to the cell altogether?

Use the formula given above, and substitute into it the values that you know:

Q = I x t = 2.5 x (4 x 60) = 2.5 x (4 x 3600) = 36,000 Coulomb

___ 2 b. The current through a lamp is 0.2 A. Calculate the time taken for 50 C of charge to pass through the lamp

Take the equation given and rearranged in terms of t:

Q = I x t therefore t = Q / I = 50 / 0.2 = 250s or 4 minutes and 10 seconds.

___ 2 c. A cell has a charge of 102 C passing through it every minute. Calculate the current flowing through the cell.

Once again take the standard equation and rearrange it in terms of current this time, or I:

Q = I x t therefore I = Q / t = 102 / 60 = 1.7 A