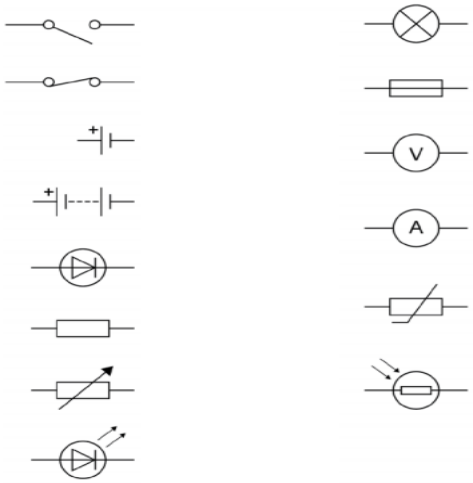
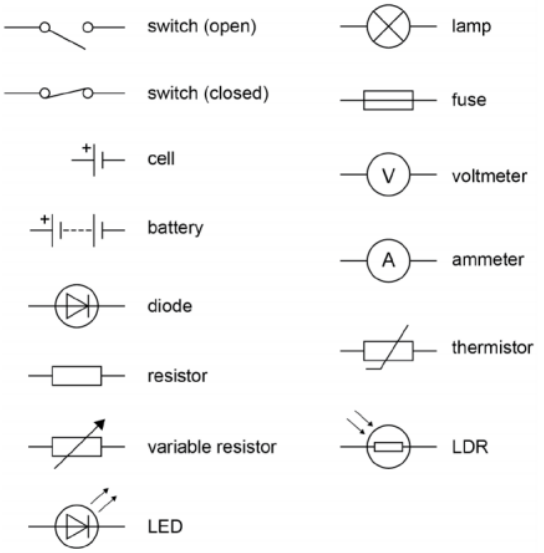
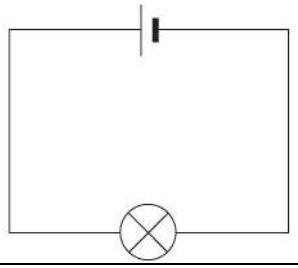
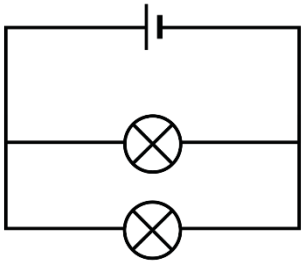
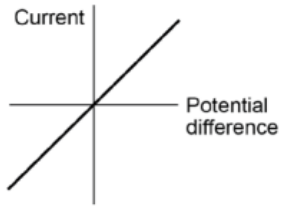
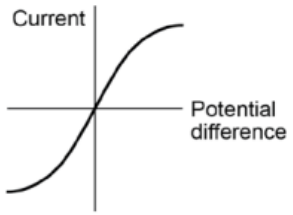
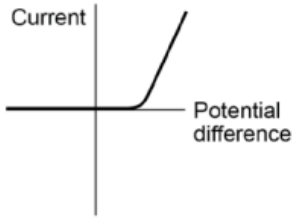
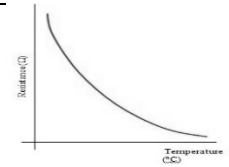
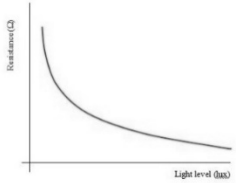
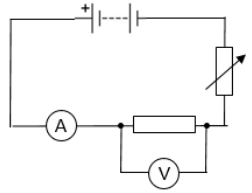
Core questions – Physics unit 2 - Electricity

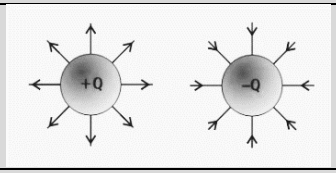
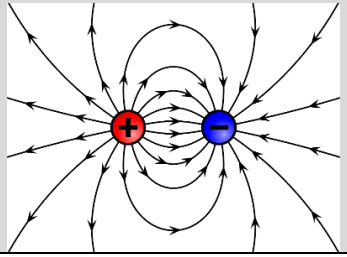
No.	Question	Answer
1	Label these curcuit symbols: 	
2	How is energy transferred by electrical working?	It flows in an electrical circuit
3	What is electrical current?	The rate of flow of electrical charge
4	In most circuits, what is the charge that flows to carry the current?	Electrons
5	What is needed for electrical charge to flow through a closed circuit?	A source of potential difference.
6	What is a circuit diagram?	Simplified circuit drawings using symbols
7	What is a series circuit?	A circuit where all of the components are connected in one loop.
8	Draw a series circuit containing a cell and a bulb.	
9	What is the parallel circuit?	A circuit where there is more than one loop of components.
10	Draw a parallel circuit containing a cell and two bulbs.	

11	What can you say about the current anywhere in a series circuit?	It stays the same
12	What happens to the current in a parallel circuit?	It is shared between the branches but the total stays the same
13	What happens if there is a break in a series circuit?	The current stops flowing
14	What happens if there is a break in one branch of a parallel circuit?	The current stops in that branch only
15	What is the word equation for flow of charge?	charge flow = current x time
16	What is the symbol equation for flow of charge?	Q = I t
17	What is the unit and unit symbol of charge?	Coulombs, C
18	What is the unit and unit symbol of current?	Amps, A
19	What piece of equipment is used to measure current?	Ammeter
20	How are ammeters arranged in a circuit?	In series
21	What is the direction of conventional current?	Positive to negative
22	What is another name for potential difference?	Voltage
23	What is potential difference?	The amount of energy lost or gained by one unit of charge
24	What is the unit and unit symbol of potential difference?	Volts, V
25	What piece of equipment is used to measure potential difference?	Voltmeter
26	How are voltmeters arranged in a circuit to measure the potential difference?	In parallel to the component you are measuring
27	What happens to the potential difference in series circuit?	It is shared between the components
28	What should all of the potential differences add up to in a series circuit?	The potential difference of the battery
29	What happens to the potential difference in a parallel circuit?	The total potential difference across each branch is the same as the potential difference from the battery
30	What equation links potential difference, current & resistance?	potential difference = current x resistance
31	What is the symbol equation for potential difference?	V = I R
32	What is resistance?	Anything in a circuit that slows down the flow of current
33	What is the unit and unit symbol of resistance?	Ohms, Ω (omega)
34	What do we call materials with a low resistance?	Conductors
35	What do we call materials with a high resistance?	Insulators
36	What is the job of a battery in a circuit?	Is the source of the potential difference (Provides the energy)
37	What happens if you add more batteries to a circuit?	More current will flow, the current will increase
38	What happens to the resistance if you add more resistors in series?	it increases
39	What happens to the resistance if you add more resistors to each branch in parallel?	Total resistance decreases
40	In the required practical on measuring resistance, what is the dependent variable?	Resistance
41	For some resistors, the resistance always remains constant. In others, it can change as…	The current changes.
42	At a constant temperature, the current through an ohmic conductor is…	Directly proportional to the potential difference across the resistor.

43	What does the I-V graph for an ohmic conductor look like?	
44	What does it mean that a component is "ohmic"?	Resistance remains constant as current changes.
45	What happens to the resistance of a filament lamp as the potential across the lamp increases?	It increases.
46	Why does the resistance of a filament lamp increase as the potential difference across it increases?	The wire heats up so particles move faster, getting in the way of moving charges more often
47	What does the I-V graph for a filament lamp look like?	
48	Describe the current flow through a diode.	It can only flow in one direction. There is a very high resistance in the reverse direction.
49	What does the I-V graph for a diode look like?	
50	Why does a diode only allow current to flow in one direction?	The particles act like a valve, only allowing charges to travel in one direction
51	What is a thermistor?	A temperature dependent resistor
52	What happens to the resistance of a thermistor when the temperature increases?	It decreases
53	Why does resistance of a thermistor decrease when the temperature increases?	Thermal energy helps the particles to line up and allow charges through more easily
54	What does a resistance-temperature graph look like for a thermistor?	
55	When would a thermistor be useful?	Thermostats – to make things change with temperature
56	What is an LDR?	A Light Dependent Resistor

57	What happens to the resistance of an LDR when the light intensity increases?	It decreases
58	Why does resistance of an LDR decrease when the light intensity increases?	Light energy helps the particles to line up and allow charges through more easily
59	What does a resistance-light intensity graph look like for a LDR?	
60	When would an LDR be useful?	Light sensors - to switch on lights when it gets dark
61	To measure the resistance of a component, what measurements should be made?	Measurements of the current through the component and the potential difference across it.
62	Draw a circuit to show how the resistance of a resistor could be measured?	
63	In the required practical on investigating I-V characteristics of components, what is the independent variable?	The current through the component
64	What happens to the potential difference across a wire when the length of the wire increases?	The longer the wire, the higher the resistance
65	In a series circuit, what can be said about the current?	The current is the same through each component.
66	In a series circuit, what can be said about the potential difference?	The sum of the potential difference across each component is equal to the potential difference of the battery
67	In a series circuit, what can be said about the resistance?	The total resistance is the sum of the individual resistances.
68	What is the equation for the total resistance of a series circuit?	$R_{tot} = R_1 + R_2 \ldots$
69	In the branches of a parallel circuit, what can be said about the current?	The total current is equal to the sum of the current in each branch
70	In the branches of a parallel circuit, what can be said about the potential difference?	The potential difference across each branch is the same and the battery
71	In the branches of a parallel circuit, what can be said about the resistance?	The total resistance in the circuit is less than the resistance of the lowest of the resistor in any branch
72	Why does adding resistors in parallel decrease the total resistance?	There are more routes for electrons to take between the branches, so it is easier for current to flow.
73	What does DC stand for?	Direct Current
74	In what direction does DC current flow?	Current flows in one direction (positive to negative for conventional current)
75	What type of circuits use DC?	Circuits powered by a cell or battery
76	What does AC stand for?	Alternating Current

77	Describe the flow of current in an AC circuit	The current flow rapidly changes direction, giving an alternating potential difference.
78	What type of current does mains electricity use?	Alternating current
79	What the frequency of the AC domestic electricity supply in the UK?	50 Hz, (50 cycles per second)
80	What is the potential difference of the domestic electricity supply in the UK?	230 V
81	How many wires make up the cables of most electrical appliances?	3
82	Why is each wire wrapped in a plastic coating?	As a safety feature. The plastic acts as an insulator from the electricity
83	What does the colour coding on each wire identify it as?	Brown - live wire Blue - neutral wire Green and yellow stripes - earth wire
84	What does the live wire do, and what is its potential?	It carries the alternating potential from the power supply. The potential difference between the live wire and earth is around 230 V.
85	What does the neutral wire do, and what is its potential?	It completes the circuit, and is close to earth potential (0 V).
86	What does the earth wire do, and what is its potential?	It is a safety wire to stop the casing of the appliance from becoming live, so is at 0V and only carries a current if there is a fault.
87	When is a live wire dangerous?	They are always dangerous when a current is flowing, because they carry a potential of 230V.
88	Why is it dangerous to touch a live wire?	A persons potential is 0V. Touching the live wire causes a potential difference of 230V and the charge is carried through the person.
89	What is power?	The amount of energy transferred per second
90	What is the unit of power and the unit symbol?	Watts, W
91	What does the amount of energy an appliance transfers depend on?	The power of the appliance and how long it is switched on for.
92	What does work have to do with electric circuits?	Work is done when charge flows in a circuit.
93	What two **word** equations relate energy transferred, power, time, charge and potential difference?	energy transferred = power x time energy transferred = charge x potential difference
94	What two **symbol** equations relate energy transferred, power, time, charge and potential difference?	$E = P\ t$ $E = Q\ V$
95	What is the unit and unit symbol of energy?	Joules, J
96	What is the power transfer in a circuit related to?	The potential difference across the circuit, the current through it and the energy changes over time.
97	What two word equations relate power, potential difference, current and resistance?	power = potential difference x current power = $(\text{current})^2$ x resistance
98	What two symbol equations relate power, potential difference, current and resistance?	$P = V\ I$ $P = I^2\ R$
99	What does the power rating of an appliance mean?	The maximum operating power that is safe for the appliance.
100	What is the National Grid?	The National Grid is a system of cables and transformers linking power stations to consumers.

101	What is a transformer?	A device which alters the potential difference and current of electricity in the cables.
102	What does a step-up transformer do?	They are used to increase the potential difference from the power station to the transmission cables
103	Why do we increase the potential difference across the cables?	To decrease current and reduce the energy loss due to heating.
104	What does a step-down transformer do?	They are used to decrease the potential difference for safe domestic use.
105T	Why is static-electricity called "static"? **(Triple only)**	It is related to "static" (or still) electrons which build up on materials.
106T	What type of charge do electrons have? **(Triple only)**	Negative charge
107T	How is static electricity produced? **(Triple only)**	When certain insulating materials are rubbed, the friction causes negatively charged electrons to move from one material to another
108T	Which sub-atomic particle is transferred between materials to generate a static charge? **(Triple only)**	Negatively charged electrons
109T	If a material gains electrons what charge will it have? **(Triple only)**	The material that gains electrons becomes negatively charged.
110T	If a material loses electrons what charge will it have? **(Triple only)**	The material that loses electrons is left with an equal positive charge.
111T	What happens when electrically charged objects are brought close together? **(Triple only)**	When two electrically charged objects are brought close together they exert a force on each other.
112T	What is the name of the force that exists between charged objects and what type of force is it? **(Triple only)**	Electrostatic, Non-contact (the objects do not need to touch)
113T	What happens to two objects with the same type of charge? **(Triple only)**	They repel each other.
114T	What happens to two objects with different types of charge? **(Triple only)**	They are attracted to each other.
115T	What is an electric field? **(Triple only)**	A field created around a sphere of charge
116T	What happens if another charged object is placed in the field? **(Triple only)**	A second charged object placed in the field experiences a force.
117T	Where is the charge strongest in an electric field? **(Triple only)**	The closer an object is to the charged sphere, the stronger the force
118T	In what direction do field lines flow in a positive and negative charge? **(Triple only)**	Out of a positive object, into a negative object
119T	How do field lines show the strength of a field? **(Triple only)**	The closer the lines the stronger the field
120T	What would the field lines look like round isolated, charged spheres? **(Triple only)**	
121T	What does the electric field pattern look like for a positive charge near a negative charge? **(Triple only)**	

122T	When will static cause a spark? **(Triple only)**	If there is a high enough potential difference between a charged object and the earth/earthed object (0V)
123T	What causes the spark? **(Triple only)**	An electric field occurs between the charged object and the earth object. Air particles in the electric field are ionised (electrons are removed) Ionised air is a conductor and so a current flows between the charged object and the earthed object