Combined Physics

Cheeky 1 Markers

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| Paper 1 | |
| 1. Give the equation that links kinetic energy mass and speed | kinetic energy = 0.5 × mass × (speed)2 |
| 1. Give the equation that links gravitiational potential energy, mass, gravitational field strength and height | gravitational potential energy = mass  × gravitational field strength × height |
| 1. Give the equation that links power, energy transferred and time |  |
| 1. Give the equation that links work done, time and power |  |
| 1. Give the equation that links efficiency, useful output energy transfer and total input energy transfer |  |
| 1. Give the equation that links resistance, current and power | Power = (current)2 x resistance |
| 1. Give the equation that links time, energy transferred and power | Energy transferred = power x time |
| 1. Give the equation that links charge flow, potential difference and energy transferred | Energy transferred = charge flow x potential difference |
| 1. Give the equation that links mass, volume and density |  |
| 1. Give the equation that links current, time and charge flow | Charge flow = current x time |
| 1. Give the equation that links potential difference, current and resistance | Potential difference = current x resistance |
| 1. Give the equation that links current, potential difference and current | Power = potential difference x current |
| 1. Define the term specific heat capacity | the amount of energy  required to raise the temperature of one kilogram of the substance  by one degree Celsius. |
| 1. Define the term power | Power is defined as the rate at which energy is transferred or the  rate at which work is done. |
| 1. Wasted energy is often dissipated ,give the ways this energy is generally transferred to the surroundings | Heat and sound |
| 1. Describe what is meant by the term “renewable energy resource” | A renewable energy resource is one that is being (or can be)  replenished as it is used. |
| 1. Give the main energy resources available for use on earth | Fossil fuels, nuclear fuel, bio-fuel, wind, hydroelectricity, geothermal, the tides, the sun and water waves |
| 1. Describe the environmental impacts of using fossil fuels | They are non-renewable so we will run out, when burned they produce CO2 which causes global warming, they can cause huge environmental disasters if not removed from the stores safely (eg oil spills) |
| 1. Sketch the current potential difference graph for a fixed resistor |  |
| 1. Sketch the current potential difference graph for a filament lamp |  |
| 1. Describe why the filament lamp has a different shaped current potential difference graph to the fixed resistor | As temperature increases the resistance increases, when this increases the current will decrease, so the graph will curve slightly |
| 1. Sketch the current potential difference graph for a diode |  |
| 1. Describe why the diode has a different shaped current potential difference graph to the fixed resistor | The current can only flow through the diode in one direction, because the diode has very high resistance in the reverse direction |
| 1. Give the potential difference and Frequency of mains electricity in the UK | 230V 50Hz |
| 1. Draw the particle arrangement in solids, liquids and gases |  |
| 1. Define the term internal energy | The total kinetic energy and potential energy of all the particles which make up a system |
| 1. Describe how heating changes the internal energy within a system | Heating increases the energy of the particles within the system, this either raises the temperature of the system or produced a change of state. |
| 1. Define the term specific heat capacity | The specific heat capacity of a substance is the amount of energy required to raise the temperature of one kilogram of the substance by one degree Celsius |
| 1. Define the term specific latent heat | The amount of energy required to change the state of one kilogram of the substance with no change in temperature. |
| 1. On this graph label the specific latent heat of fusion and the specific latent heat of vaporisation, and the 3 states of matter. |  |
| 1. Describe the motion of particles in a gas | Particles are in constant random motion. |
| 1. Describe and explain how increasing the temperature of a gas will affect the pressure exerted by the gas on a container | The pressure will increase because the particles will have a higher kinetic energy and will collide more frequently with the sides of the container. |
| 1. Describe how the size of a nucleus compares to the size of an atom. | A radius of the nucleus is 1/10 000 of the radius of an atom |
| 1. Give the number of protons, neutrons and electrons in an atom of Nickel | Protons = 28  Electrons = 28  Neutrons = 59-28 = 31 |
| 1. Define the term isotope | An element with the same number of protons and electrons (same atomic number), but different numbers of neutrons (therefore a different mass number) |
| 1. Some isotopes are unstable, and therefore radioactive. Explain why these isotopes decay | They are unstable so give out radiation randomly to become stable |
| 1. Define the term half life. | This is the time it takes for the number of nuclei of the isotope in a sample to half, or the time it takes for the count rate from a sample containing the isotope to half. |
| 1. Define the term Radioactive contamination | The unwanted presence of materials containing radioactive atoms on other materials. |
| 1. Define the term Irradiation | The process of exposing an object to nuclear radiation – an irradiated object does not become radioactive. |

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| Paper 2 |

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| 1. Give the equation that links mass, weight and gravitational field strength | weight = mass × gravitational field strength |
| 1. Give the equation that links force, distance and work done | work done = force × distance  (along the line of action of the force) |
| 1. Give the equation that links the spring constant, force applied to a spring and extension | force applied to a spring = spring constant × extension |
| 1. Give the equation that links time, speed and distance | distance travelled = speed × time |
| 1. Give the equation that links acceleration, time taken and change in velocity |  |
| 1. Give the equation that links resultant force, mass and acceleration |  |
| 1. Give the equation that links velocity, mass and momentum | Momentum = mass x velocity |
| 1. Give the equation that links wave speed, frequency and wavelength | Wave speed = frequency x wavelength |
| 1. Describe the difference between scalar and vector quantities. | Scalar quantities have magnitude only, whereas vector quantities have magnitude and an associated direction. |
| 1. Describe the difference between a contact force and a non-contact force. | With contact forces the objects are physically touching, however with non-contact forces the objects are physically separated. |
| 1. Give examples of contact forces | Friction, air resistance, tension |
| 1. Give examples of non-contact forces | Gravitational force, electrostatic force and magnetic force |
| 1. Are forces scalar or vector quantities, explain your answer | Vector, as they have magnitude and a direction which they act in. |
| 1. How many joules of work is done, when a force of one newton causes a displacement of one metre | 1 Joule  Because 1 Joule = 1 Newton – metre |
| 1. Explain the difference between speed and velocity | Speed is a scalar quantity, velocity is a vector quantity. This means that velocity also involved the direction the object is travelling in. |
| 1. Give the typical speeds of someone walking, running, cycling and the speed of sound in air | Walking ~ 1.5 m/s  Running~ 3m/s  Cycling ~ 6 m/s  The speed of sound in air is 330m/s |
| 1. Give Newton’s First law | If the resultant force acting on an object is zero and:  • the object is stationary, the object remains stationary  • the object is moving, the object continues to move at the same speed and in the same direction. So the object continues to move at the same velocity |
| 1. Give Newton’s Second law | The acceleration of an object is proportional to the resultant force acting on the object and inversely proportional to the mass of the object.  Force = mass x acceleration |
| 1. Give Newton’s Third law | Whenever two objects interact, the forces they exert on each other a equal and opposite. |
| 1. Give the equation for the stopping distance | Stopping distance = thinking distance + breaking distance |
| 1. Give factors that can affect the thinking distance | Alcohol or drugs, distraction, speed |
| 1. Give factors that can affect the breaking distance | Road conditions, weather, speed |
| 1. Define the term conservation of momentum | In a closed system, the total momentum before an event is equal to the total momentum after the event |
| 1. Describe the motion of a longitudinal wave | The oscillations are parallel to the motion of the wave |
| 1. Describe the motion of a transverse wave | The oscillations are perpendicular to the motion of the wave |
| 1. Give the order of the electromagnetic spectrum from highest frequency to lowest frequency. | Gamma, X-Rays, Ultraviolet, Visible light, Infrared radiation, microwaves, Radiowaves |
| 1. Give a use of radio waves | Communication (eg radio) because they produce oscillations in electrical circuits |
| 1. Name the types of Electromagnetic radiation which are hazardous to human tissue and give their effect | UV, X-Rays and gamma are ionising. |
| 1. Give a use of microwaves | Satellites and cooking food |
| 1. Give a use of Infrared radiation | Electric heaters |
| 1. Give a use of visible light | Fibre optic communications |
| 1. Give a use of ultraviolet waves | Sun tanning and energy efficient lamps |
| 1. Give a use of X-rays and Gamma rays | Medical imaging and treatments |
| 1. Describe whether magnetism is a contact or non-contact force | Non-contact, the objects don’t need to touch to experience attraction or repulsion |
| 1. Describe the difference between a permanent magnet and an induced magnet | A permanent magnet produces its own magnetic field. An induced magnet is a material that becomes a magnet when it is placed in a magnetic field, and always causes a force of attraction. When removed from the magnetic field it loses most/all of its magnetism quickly. |
| 1. Name the magnetic elements | Iron, cobalt, nickel (steel is NOT an element but is an alloy of iron so is magnetic) |
| 1. Name the part of a magnet where the field is strongest | At the poles |
| 1. Draw the field lines surrounding a bar magnet |  |
| 1. Give 2 factors which affect the strength of the magnetic field around a wire | Current and the distance from the wire |
| 1. Describe how the strength of the field could be increased | Shape the wire into a solenoid, add an iron core to the solenoid |
| 1. Give the factors represented by Fleming’s left hand rule | Force (thumb)  Magnetic field (index finger)  Current (middle finger) |
| 1. Describe what is meant by the “motor effect” | When a conductor carrying a current is placed in a magnetic field the magnet producing the field and the conductor exert a force on each other. |
| 1. Describe how the direction of an electric motor can be changed | Change the direction of the magnetic field, change the direction of the current. |