Name: ……. GCE A Level Physics Unit 4

Momentum Concepts Force Impulse Time Conservation Collisions and explosions	Can you explain the relationship between force and momentum? Can you explain the conservation of linear momentum law? Can you explain the difference between elastic and inelastic collisions?	
Circular Motion Acceleration Angular Speed Centripetal Acceleration Centripetal Force Radians	Can you explain why objects moving at a constant speed in a circular path are said to be accelerating? Can you calculate the angular speed of a spinning object? Can you calculate the centripetal acceleration and force on a spinning object?	
Simple Harmonic Motion Conditions Graphical representation Velocity Gradient Maximum Speed Maximum Acceleration Mass Spring systems Pendulums Harmonic Oscillators Variation of Ek, Ep, and total energy Damping Critical Damping	Can you describe the conditions required for simple harmonic motion to occur? Can you find the velocity from a displacement - time graph? Can you find the maximum speed and acceleration for a spinning object? Can you describe the energy changes as a mass spring system oscillates? Can you describe and calculate the energy changes when a pendulum oscillates? Can you describe what damping and Critical damping are?	

Forced Vibrations and Resonance Free and forced vibrations Resonance Damping effects on resonance Phase Difference Stationary waves	Can you explain the difference between a forced and a free oscillation? Can you describe the effects of damping on a resonating system? Can you describe what is meant by the phase difference of the driver and the driven resonating objects?	
Gravitation Newton's laws Gravity Universal Attractive Force Point mass Gravitational Constant	Can you define Newton's laws of gravitational attraction? Can you explain what G is? Can you find G on your formula sheet?	
Gravitational Field Strength Force Field Gravitational Field lines g Magnitude of g in a radial field Forces as vectors	Can you define a force field? Can you calculate g on a given body given force and mass values? Can you find the magnitude of g in a radial field if you know the distance and mass of the attractive object?	
Gravitational Potential Zero value at infinity Gravitational potential difference Work done Graphical versions of g, and V with r Equipotential surfaces V in a radial field Negative signs Area under a g vs r graph gives V	Can you define gravitational potential? Can you calculate work done by an object moving towards a larger body? Can you explain why no work is done when moving along an equipotential surface? Can you explain the significance of the negative sign for gravitational potential? Can you find the value of V from a graph of g vs r?	

Orbits of planets Orbital period Orbital speed Radius effects Geosynchronous orbits Energy considerations Escape velocity Satellites	Can you find the orbital period for a satellite with a specified radius? Can you describe the energy considerations for an orbiting satellite? Can you find the orbital speed of a satellite with a specified radius? Can you calculate the total energy of an orbiting satellite? Can you calculate the escape velocity of an object attempting to leave a large planetary body?	
Electric Fields Coulombs law Permittivity of free space Charged spheres Electric field lines Electric field strength Work done moving between plates Trajectory Uniform electric fields Magnitude of E	Can you define Coulombs law? Can you recall how we treat air when we are calculating the forces between charges? Can you calculate the electric field strength for a given point charge? Can you define the trajectory of a moving, charged particle in a uniform electric field? Can you derive an equation for Work done from Fd = EQ?	
Electric field strength Force per unit charge E in a radial field E in a uniform field Field lines	Can you find the electric field strength of a point charge from its Force and Charge? Can you draw field lines for a uniform electric field between two plates? Can you use mathematical equations to find E in radial and uniform fields?	
Electric Potential Absolute electric potential Work done in moving charges Variations of E with V and r changing Equipotential surfaces Electric potential difference	Can you define absolute electric potential? Can you calculate the work done of a charge in a radial and uniform field? Can you describe why the work done moving in a equipotential surface is zero?	

Comparing Electric and Gravitational Fields		
Inverse square law	Can you write an in depth description of the differences between electric and gravitational fields?	
Masses		
Charges	Can you write an in depth description of the similarities between electric and gravitational fields?	
Magnitude		
Capacitance	Can you define capacitance?	
Charge		
Voltage	Can you find the capacitance of a material using charge and voltage readings?	
Permittivity		
Dielectric constant	Can you explain what is meant by relative permittivity and dielectric constant?	
Polar molecules		
Area under a charge/p.d. graph	Can you describe the motion of a simple polar molecule that rotates in an electric field?	
Energy stored		
Potential Difference	Can you find the Energy stored in a material using the area under a charge/potential difference graph?	
Capacitor Discharge		
Charge and Discharge Curves	Can you recognise typical charge and discharge curves for capacitors?	
Time Constants		
Time to halve	Can you calculate the time constant for a discharging or charging capacitor?	
Resistance		
Voltage	Can you use suitable formulae to find the remaining charge at any point during discharge or charging?	
Charge		
Coulombs	Can you find the time to get to half of the capacitors charge value?	
Capacitance		
Magnetic Fields		
Force on a wire	Can you explain what will happen to a current carrying wire with regard to its movement?	
Flemings left hand rule		
Magnetic flux density	Can you define the Tesla?	
Tesla		
Perpendicular to current	Can you define and use Fleming's left hand rule?	
Units		
	Can you find the magnetic flux density of a given field?	

Moving charges Force Charge Magnetic Field Strength Circular path Cyclotron Magnetic Flux Flux linkage Normal	Can you find the force acting on a charged particle moving in a magnetic field? Can you describe the reason for the circular path of particles in a device such as a cyclotron/ Can you define magnetic flux? Can you define flux linkage?	
Electromagnetic Induction Faraday's and Lenz's laws Induced EMF Area Angular Velocity Transformers Efficiency	Can you define Faraday's and Lenz's laws? Can you find the emf induced in rotating coil in a uniform magnetic field? Can you find the induced emf of a given coil? Can you describe the causes of inefficiency in a transformer?	
	That's it. Really.	