

Name:

GCE A Level Physics Unit 5

Radioactivity Nucleus Rutherford Scattering Alpha Particles Beta Particles Inverse Square law Background radiation	Can you explain what evidence Rutherford gathered for the existence of the nucleus?	
	Can you explain the causes of Rutherford scattering?	
	Can you define the characteristics of alpha and beta particles?	
	Can you explain how a scientist might check a source for its intensity and method of decay?	
Radioactive Decay Decay constant Activity Half life Decay curves Storage of waste	Can you describe the random nature of radioactive decay?	
	Can you find the activity remaining of a source?	
	Can you find the half life of a material and use this to describe the relevance to storage of waste?	
Nuclear instability Graph of N vs Z Decay modes Unstable nuclei Excited states Use of technetium 99m Nuclear radius Electron diffraction Nuclear density Half life Mass Volume Gamma source	Can you describe a typical stability graph for nuclei?	
	Can you describe the type of decay mode a material may use based on its position in the NZ graph?	
	Can you represent different decay modes in a nuclear equation?	
	Can you describe what is meant by nuclear excited states?	
	Can you recall uses of materials such as technetium 99m and the reasons for its selection?	
	Can you describe how scientists would use the closest approach of a alpha particle to a nucleus to estimate its radius?	
	Can you calculate the nuclear density of a given nuclei?	

Nuclear Energy $E = mc^2$ Binding Energy Fission Fusion Atomic mass unit	Can you apply Einstein's law for Energy to find the mass or energy of a given object? Can you define binding energy? Can you convert between atomic mass units and kilograms?	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div>
Induced Fission Thermal neutrons Chain reaction Critical mass Moderator Control rods Coolant	Can you describe how fission is induced using ideas about thermal neutrons? Can you explain the role of the moderator and coolant within the reactor? Can you describe the factors affecting the choice of material for the moderator, control rods and coolant?	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div>
Thermal Physics Thermal energy Change of energy Temperature Specific Heat Capacity Specific latent heat Continuous flow	Can you find the specific heat capacity if given a scenario where the temperature of a material of know mass has changed? Can you find the temperature needed to change a materials state if you are given that materials specific latent heat? Can you describe what is meant by continuous flow?	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div>
Ideal Gases Gas laws Pressure Volume Temperature Absolute Zero Avogadro constant Molar and molecular mass Work done	Can you define the gas laws? Can you define what is meant by absolute zero? Can you use the ideal gas equation to find the number of moles for a given gas? Can you find the molar or molecular mass of a given gas? Can you calculate the work done by a gas if you are given values for pressure and change in volume?	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div>

Molecular Kinetic Theory model Relationships between p , v , and T Derivation of pV Average molecular kinetic energy	<p>Can you describe the relationships between pressure, volume and temperature?</p> <p>Can you derive a formula for the pressure and volume of a gas using the Avogadro constant?</p>	<div></div> <div></div> <div></div> <div></div>
OPTIONAL UNIT APPLIED PHYSICS Concept of moment of Inertia Rotational kinetic energy Energy storage Flywheel Uses of flywheels Angular displacement Angular velocity Angular acceleration Angular momentum Torque Power	<p>Can you define and calculate the moment of inertia for a given rotating mass?</p> <p>Can you find the energy storage capacity of a rotating flywheel?</p> <p>Can you describe the uses of flywheels in machines?</p> <p>Can you use appropriate formulae to find the angular velocity, acceleration and displacement for a rotating object?</p> <p>Can you find the torque acting on a system?</p> <p>Can you find the angular momentum of a spinning object?</p> <p>Can you find the power used in rotating machinery by using the torque?</p>	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div>
Thermodynamics First law Heat Internal energy Work done	<p>Can you define the first law of thermodynamics?</p> <p>Can you use the first law to find the change in internal energy in a system that is cooling or heating?</p>	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div>
Non flow processes Isothermal Adiabatic Constant pressure Constant volume changes Application of the first law	<p>Can you define the terms isothermal and adiabatic?</p> <p>Can you use relevant formula to find the constant values given under isothermal and adiabatic conditions?</p> <p>Can you find the work done in an isothermal or adiabatic process?</p>	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div>

Pressure – Volume Diagrams Work done Cyclic processes Area of loop Work done per cycle	Can you find the work done from a graph of pressure vs volume? Can you extend the idea of work done by a pressure and volume change for a repeating process?	<div></div> <div></div> <div></div> <div></div> <div></div>
Engine Cycles Four stroke petrol engine cycle Four stroke diesel engine cycle Indicator diagrams Power Efficiency Indicated power Output or brake power Overall efficiency Mechanical efficiency Thermal efficiency	Can you describe the operation of a four stroke petrol and/or diesel engine? Can you compare the theoretical diagrams for the cycles in these engines with the actual cycles? Can you find the input power for a given flow rate and calorific value of fuel? Can you find the output or brake power using ideas about torque? Can you find the various types of efficiencies listed in the keyword list next to this sentence?	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div>
Second law and engines Source Sink Efficiency Theoretical efficiency Work done Temperature output uses	Can you describe the need for an engine to operate between a heat source and a heat sink? Can you find the theoretical and actual efficiency of an engine? Can you find the work done and thus the change in temperature through losses? Can you explain how lost energy can sometimes be put to more useful purposes?	<div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div>
Reversed heat engines Heat pumps Refrigerators	Can you apply the same rules as the second law in reverse heat engines? Can you explain the difference between a reverse heat engine and a normal one?	<div></div> <div></div> <div></div> <div></div>
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	And basically that's A Level Physics.	<div></div>