ADDITIONAL SCIENCE P3: PHYSICS **Higher content in bold**	Video	Exam Q	☺☹
X-rays (part of em spectrum), have a very short wavelength & cause ionisation.			
X-rays can be used to diagnose and treat some medical conditions.			
Precautions to be taken when X-ray machines and CT scanners are in use.			
Electronic systems can be used to produce ultrasound waves, which have a frequency higher than the upper limit of hearing for humans.			
Ultrasound waves are partially reflected when they meet a boundary between two different media. The time taken for the reflections to reach a detector can be used to determine how far away such a boundary is.			
Calculation of the distance between interfaces in various media: s = v x t			
Ultrasound waves can be used in medicine.			
Refraction is the change of direction of light as it passes from one medium to another.			
A lens forms an image by refracting light.			
In a convex or converging lens, parallel rays of light are brought to a focus at the principal focus. The distance from the lens to the principal focus is called the focal length. Refractive index = sin i / sin r			
The nature of an image is defined by its size relative to the object, whether it is upright or inverted relative to the object and whether it is real or virtual.			
The nature of the images produced by converging and diverging/concave lenses for an object placed at different distances from the lenses and uses of each lens.			
The construction of ray diagrams to show the formation of images by converging and diverging lenses.			
The magnification produced by a lens is calculated using the equation: Magnification = image height / object height			
The structure of the eye and the range of vision. The eye can focus on objects between the near point and the far point.			
Comparison between the structure of the eye and the camera.			
The power of a lens is given by: P = 1/f (where f is the focal length, in m)			
The focal length of a lens is determined by: the refractive index of the material from which the lens is made, and the curvature of the two surfaces of the lens.			
For a given focal length, the greater the refractive index, the flatter the lens. This means that the lens can be manufactured thinner.			
Total internal reflection and critical angle: **Refractive index = 1 / sin c**			
Visible light can be sent along optical fibres.			
The laser as an energy source for cutting, cauterising and burning.			
The centre of mass of an object is that point at which the mass of the object may be thought to be concentrated.			
If freely suspended, an object will come to rest with its centre of mass directly below the point of suspension.			
The centre of mass of a symmetrical object is along the axis of symmetry.			
For a simple pendulum: T = 1 / f			
The time period depends on the length of a pendulum.			
The turning effect of a force is called the moment.			
The size of the moment is given by the equation: M = F x d			
If an object is not turning, the total clockwise moment = total anticlockwise moment.			

The calculation of the force, or its distance from pivot, acting on a balanced object if the line of action of the weight of an object lies outside the base of the object there will be a resultant moment and the body will tend to topple.			
Liquids are virtually incompressible, the pressure in a liquid is transmitted equally in all directions.			
The use of different cross-sectional areas on the effort and load side of a hydraulic system enables the system to be used as a force multiplier.			
The pressure in different parts of a hydraulic system is given by: P = F / A			
When an object moves in a circle it continuously accelerates towards the centre of the circle. This acceleration changes the direction of motion of the body, not its speed.			
The resultant force causing this acceleration is called the centripetal force and is always directed towards the centre of the circle.			
The centripetal force needed to make an object perform circular motion increases as: - the mass of the object increases - the speed of the object increases - the radius of the circle decreases.			
When a current flows through a wire a magnetic field is produced around the wire.			
The motor effect and its use.			
The size of the force can be increased by: - increasing the strength of the magnetic field - increasing the size of the current.			
The conductor will not experience a force if it is parallel to the magnetic field.			
The direction of the force is reversed if either the direction of the current or the direction			
If an electrical conductor 'cuts' through a magnetic field a potential difference is induced across the ends of the conductor.			
If a magnet is moved into a coil of wire a PD is induced across the ends of the coil.			
The basic structure of the transformer: An alternating current in the primary coil produces a changing magnetic field in the iron core and hence in the secondary coil. This induces an alternating potential difference across the ends of the secondary coil.			
In a step-up transformer the potential difference across the secondary coil is greater than the potential difference across the primary coil.			
In a step-down transformer the potential difference across the secondary coil is less than the potential difference across the primary coil.			
The potential difference across the primary and VP secondary coils of a transformer are related by the equation: VP / VS = nP / nS			
If transformers are assumed to be 100% efficient, the electrical power output would equal the electrical power input. Vp x Ip = Vs x Is			
Switch mode transformers operate at a high frequency, often between 50 kHz & 200 kHz.			
Switch mode transformers are much lighter and smaller than traditional transformers working from a 50 Hz mains supply.			
Switch mode transformers use very little power when they are switched on but no load is applied.			