

## 91523 Demonstrate understanding of wave systems

Topic	Key words	Q #.	Year
Pan flute	Sound • pipes • harmonic • nodes • antinodes • fundamental • frequency	One	2016
Model Plane	Radio-controlled • sound • frequency • hertz • Doppler	Two	2016
Diffraction	Diffraction grating • laser • wavelength • anti-nodal • spectrum	Three	2016
Shower cubicle	Shower • pipe • node displacement node • antinode • resonance • standing waves • loudspeaker • blocked pipe • water	One	2015
Novelty glasses	Novelty glasses • laser • slit • diffraction • wavelength • maxima • interference	Two	2015
Whirling buzzer	Buzzer • radius • motion • frequency • Doppler • beats	Three	2015
Sea Organ	Sea • Organ • Croatia • waves • pipes • closed • fundamental • wavelength • oscillations • harmonic • frequency	One	2014
Speakers in series	Speakers • interference • frequency • constructive • destructive	Two	2014
Ferry boat	Doppler • horn • frequency • tourist • beats	Three	2014
Police whistle	Police force • whistle • chamber • length • fundamental	One	2013
Ambulance	Ambulance • siren • Doppler • frequency	Two	2013
Street light	Orange • street light • scratches • wavelength • separation • monochromatic • diffraction grating • white light	Three	2013

## 91524 Demonstrate understanding of mechanical systems

Topic	Key words	Q #.	Year
Theme park ride / roller coaster	Circular track • vectors • forces • centripetal force • roller coaster	One	2016
Rolling cylinders	Cylinders • hollow • solid • energy changes • rotational inertia • slope	Two	2016
Toy bumble bee	Simple harmonic motion • oscillation • acceleration • amplitude • displacement	Three	2016
Digital TV and satellites	Digital TV • satellite • geostationary • force • speed • Kepler's law • moon	One	2015
Gravity elevator / Total Recall	Gravity elevator • Earth • North • South • acceleration • linear velocity • simple harmonic motion •	Two	2015
Cats and gravity	Cats • gravity • fall • rotation • linear momentum • angular momentum • angular velocity	Three	2015
Collapse of the Sun / Mercury	Sun • linear speed • gravity • collapse • core • angular speed • Mercury • satellite • space probe	One	2014
Pendulum	Pendulum • bob • force • horizontal circular path	Two	2014
Discs on a frictionless surface	Discs • cord • frictionless surface • speed • collision • impulse • momentum	Three	2014
Tossing balls	Mass • Tossing • tangential force • revolutions • period • angular acceleration • rotational inertia • height • hollow • solid	One	2013
Swinging balls	ball • swing • cord • centripetal force • gravitational force • tensile force • tangential speed	Two	2013
Oscillating balls	Ball • cord • oscillating • simple harmonic motion • energy • resonance • restoring force •	Three	2013

## 91526 Demonstrate understanding of electrical systems

Topic	Key words	Q #.	Year
Capacitors (Eleanor)	Charge • capacitor • capacitor voltage • resistance • graph	One	2016
Transformer	Transformer • AC voltage • primary & secondary coils • battery • current • energy	Two	2016
Measuring iron in sand	Iron • iron-sand mixture • beach • coils • core • reactance • impedance • inductance • phasor diagram • rms current • capacitor	Three	2016
AC circuit	AC circuit • variable capacitor • inductor • resistor • angular frequency • reactance • rms • phasors • current	One	2015
Capacitors / cell phone charger claim	Capacitors • dielectric constant • permittivity • cell • internal resistance • air • rapid cell phone charger • energy	Two	2015
Electromagnetic induction (traffic light detector)	Cars • bicycles • loop • traffic lights • inductor • energy • resistance • voltage • current • magnetic field • alternating current	Three	2015
Ideal transformer	Ideal transformer • coils • AC • rms voltage • peak voltage • resistor • phasor diagram • capacitor	One	2014
Batteries	Batteries • internal resistance • current • Kirchoff's laws • switch • flat battery	Two	2014
Energy	Circuit • switch • voltage • capacitor • battery • resistance • inductors • current • stored energy	Three	2014
Capacitor & flash of light	Capacitor • flash • light • resistance • charge • discharge • voltage • normal brightness • time constant of circuit	One	2013
Inductor to make a spark	Inductor • spark • voltage • energy stored • resistance • time •	Two	2013
Capacitor & inductor to make sound burst	Burst of sound • capacitor • inductor • frequency • supply voltage • reactance • resonance • speaker	Three	2013