



Sixth Form Centre

# Scheme of

**Subject: AS Ph**
**Year: 1**

Week number	Date	Topic 1 Theory	Topic2 Practical
0		Introduction to Course (Induction) Portfolio of work SI units	
1		<ul style="list-style-type: none"> <li>Atomic structure: ions, electrons</li> <li><math>I = Q/t</math></li> <li>Free moving charges (ionic solids and ionic solutions)</li> <li>Potential difference, <math>V = W/Q</math></li> <li>Electrical resistance, <math>R = V/I</math></li> </ul>	<ul style="list-style-type: none"> <li>Use of ammeter, voltmeter to measure R.</li> <li>Drawing straight line graphs (</li> </ul>
2		<ul style="list-style-type: none"> <li>Ohm's Law</li> <li>Electrical Resistance <ul style="list-style-type: none"> <li>In series</li> <li>In parallel</li> </ul> </li> <li>Electrical Resistivity <math>R = \rho L/A</math></li> </ul>	<ul style="list-style-type: none"> <li>Verification of formulae for resistors connected together</li> <li>Use of multimeter to measure resistance</li> <li>I-V characteristic of TLE</li> </ul>
3		<ul style="list-style-type: none"> <li>Power, <math>P = IV = I^2R = V^2/R</math></li> <li>Energy dissipated = Pt</li> <li>Electrical Resistance and temperature</li> </ul>	<ul style="list-style-type: none"> <li>Temperature of water &amp; thermistor (<math>R - \theta</math> and I, V, IV, etc)</li> <li><math>R - \theta</math> for thermistor</li> </ul>
4		<ul style="list-style-type: none"> <li>Potential Divider <ul style="list-style-type: none"> <li>Sensors</li> <li>Control</li> </ul> </li> <li>Kirchoff's first and second laws</li> </ul>	<ul style="list-style-type: none"> <li>I-V characteristic of semiconductor diode</li> </ul>
5		<ul style="list-style-type: none"> <li>Review</li> </ul>	<ul style="list-style-type: none"> <li>Design of temperature sensor</li> </ul>
6		<ul style="list-style-type: none"> <li>emf, <math>e = E/Q</math></li> <li>emf and internal resistance (<math>e = V + Ir</math>)</li> <li>starter motor and requirements of the power supply</li> </ul>	<ul style="list-style-type: none"> <li>measurement of emf, r for power supply</li> </ul>
7		<ul style="list-style-type: none"> <li>Alternating currents (sinusoidal)</li> <li>Rms, peak and peak-peak values</li> <li>Mains supply</li> </ul>	<ul style="list-style-type: none"> <li>Use of oscilloscope <ul style="list-style-type: none"> <li>to measure AC amplitude</li> <li>periods and frequency</li> </ul> </li> </ul>
8		<ul style="list-style-type: none"> <li>Properties of solid materials</li> <li>Density</li> <li>Hooke's Law for spring</li> <li>Energy of spring = <math>\frac{1}{2} Fx</math></li> <li>Tensile stress, strain, breaking stress</li> </ul>	<ul style="list-style-type: none"> <li>Use of micrometer and vernier calipers</li> <li>Properties of a spring, F vs x</li> <li>Properties of a rubber band</li> </ul>

9		<ul style="list-style-type: none"> <li>• Plastic and Elastic behaviour</li> <li>• Young modulus <math>E = \text{stress/strain}</math></li> <li>• Strain energy</li> </ul>	<ul style="list-style-type: none"> <li>• Measurement of <math>E</math></li> <li>• Uncertainties and fractional uncertainties 1</li> </ul>
10		<ul style="list-style-type: none"> <li>• Linear motion (position, displacement, speed, velocity, acceleration)</li> <li>• Graphical description of motion</li> </ul>	<ul style="list-style-type: none"> <li>• Measurement of gradient curve and area beneath.</li> <li>• Ticker tape and measurement of <math>v</math>.</li> </ul>
11		<ul style="list-style-type: none"> <li>• Use of equations of linear motion</li> </ul>	<ul style="list-style-type: none"> <li>• measurement of <math>g</math> (? Ticker)</li> <li>• non-linear laws (&amp; straight line)</li> </ul>
12		<ul style="list-style-type: none"> <li>• Review</li> </ul>	<ul style="list-style-type: none"> <li>• Practical Test 1</li> </ul>
13		<ul style="list-style-type: none"> <li>• 2-D motion</li> </ul>	<ul style="list-style-type: none"> <li>• Scalars and Vectors</li> <li>• Addition of vectors</li> <li>• Resolution of a vector</li> <li>• Scale drawing</li> </ul>
14		<ul style="list-style-type: none"> <li>• Linear momentum, <math>p = mv</math></li> <li>• Newton's first and second laws</li> <li>• <math>F = (mv)/t = ma</math></li> </ul>	<ul style="list-style-type: none"> <li>• Analysis of motion</li> </ul>
15		<ul style="list-style-type: none"> <li>• conditions for equilibrium</li> <li>• moment of force (torque, couple,)</li> <li>• principle of moments</li> <li>• centre of mass of a regular lamina</li> </ul>	<ul style="list-style-type: none"> <li>• position of centre of mass of irregular object</li> <li>• mass of ruler</li> </ul>
16		<ul style="list-style-type: none"> <li>• Two or more bodies: <ul style="list-style-type: none"> <li>◦ Newton's third law of motion</li> <li>◦ Conservation of linear momentum</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Analysis of motion 2</li> </ul>
17		<ul style="list-style-type: none"> <li>• Work, energy <math>W = Fs \cos \theta</math></li> <li>• Kinetic energy</li> <li>• Potential energy (gravitational)</li> </ul>	<ul style="list-style-type: none"> <li>• Practical Test 2</li> </ul>
18		<ul style="list-style-type: none"> <li>• Review</li> <li>• Heat, specific heat capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Measurement of <math>shc</math> of a</li> </ul>
19		<ul style="list-style-type: none"> <li>• Heat: examples on <math>shc</math>, heat transfer</li> <li>• Heat: specific latent heat</li> </ul>	<ul style="list-style-type: none"> <li>• Measurement of <math>h_f</math> for w</li> </ul>
20		<ul style="list-style-type: none"> <li>• Boyle's law</li> <li>• The mole</li> <li>• <math>pV = nRT</math></li> <li>• use of ideal gas equation</li> <li>• <math>T/K = \theta/^\circ C + 273.15</math></li> <li>• Internal Energy, <math>U</math></li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
21		<ul style="list-style-type: none"> <li>• simple kinetic theory</li> <li>• <math>pV = 1/3 Nm \langle c^2 \rangle</math></li> <li>• assumptions</li> <li>• temperature and <math>ke</math> of particles</li> <li>• Avogadro Number</li> <li>• Boltzmann constant</li> </ul>	<ul style="list-style-type: none"> <li>• Practical Test 3</li> </ul>
22		<ul style="list-style-type: none"> <li>• Physical Optics: refraction</li> <li>• Refractive indices</li> </ul>	<ul style="list-style-type: none"> <li>• Measurement of refractive index of a transparent solid</li> </ul>



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