



Sixth Form Centre

Scheme of

Subject: A2 Ph

Year: 2

Week number	Date	Topic 1	Topic2
0	2/09/2001	<ul style="list-style-type: none"> • Introduction to A2 	<ul style="list-style-type: none"> • Measurement of g using spring system
1		<ul style="list-style-type: none"> • Circular Motion • Radian measure • Angular speed/velocity • $v = \omega r$, $a = \omega^2 r = v^2/r$ • direction of s, v and a • Centripetal Force and resultant force 	<ul style="list-style-type: none"> • Using spreadsheets • Drawing graphs • Writing practicals and e
2		<ul style="list-style-type: none"> • Electrical capacitance • Energy stored by a capacitor 	<ul style="list-style-type: none"> • Discharge of a capacitor • Gradient of curve at a po
3		<ul style="list-style-type: none"> • Exponential Processes 1 <ul style="list-style-type: none"> ◦ Charging and discharging a capacitor ◦ Time constant, half-life ◦ $Q = Q_0 e^{-t/RC}$, $I = I_0 e^{-t/RC}$ ◦ $I = -\dot{Q}$ 	<ul style="list-style-type: none"> • Factors affecting discha capacitor. • Log graphs
4		<ul style="list-style-type: none"> • Inverse square laws: <ul style="list-style-type: none"> ◦ Newton's law of gravitation ◦ Coulomb's law • Geo-synchronous orbits • Bohr model of the atom 	<ul style="list-style-type: none"> • Factors affecting motion spring • Use of log graphs for T-
5		<ul style="list-style-type: none"> • Gravitational field strength • <i>Principle of superposition of fields</i> • Gravitational potential energy • Gravitational potential • Motion in gravitational fields 	<ul style="list-style-type: none"> • Factors affecting motion spring • Use of log graphs for T-
6		<ul style="list-style-type: none"> • Electric Field Strength <ul style="list-style-type: none"> ◦ Uniform field and radial field • Electric Potential Energy • Electric Potential • Motion in electric fields 	<ul style="list-style-type: none"> • Measurement of g by fre using a CR – circuit.

7	<ul style="list-style-type: none"> • Magnetic Fields • $F = BIL$ (Fleming's LH Rule) • $F = qvB$ • Motion of charges in a magnetic field 	<ul style="list-style-type: none"> • Practical Test 1
8	<ul style="list-style-type: none"> • Flux linkage • Electromagnetic induction 	<ul style="list-style-type: none"> • Investigation of motion of magnet on a spring using CRO/datalogger
9	<ul style="list-style-type: none"> • Review 	<ul style="list-style-type: none"> • Use of travelling microscope, • Recap on uncertainties
10	<ul style="list-style-type: none"> • Sinusoidal motion / SHM • Graphical and rotating vector descriptions • $x = A \sin(\omega t)$ • $a = -\omega^2 x$ • $a_{\max} = \omega^2 A$, $v_{\max} = \omega A$, $v = \pm\omega \sqrt{A^2 - x^2}$ • $T = 2\pi/\omega$ 	<ul style="list-style-type: none"> • Practical Test 2
11	<ul style="list-style-type: none"> • SHM: phase s, v and a • Mass-spring system <ul style="list-style-type: none"> ◦ $T = 2\pi\sqrt{m/k}$ • Simple Pendulum <ul style="list-style-type: none"> ◦ Measurement of g using $T = 2\pi\sqrt{l/g}$ • Oscillations in a lattice 	<p><u>Circus of 10 experiments:</u></p> <ul style="list-style-type: none"> • Resonance <ul style="list-style-type: none"> ◦ Strings (ac & son) ◦ Mass-spring system ◦ Electric circuit (L) ◦ Pipes (speed of sound) • Young Double Slit • spectrum of Na^+ light source (diffraction grating) • inverse square law for gamma radiation • data analysis: height of cloud • investigation of capacitor discharge with datalogger • Verification of $F = BIL$
12	<ul style="list-style-type: none"> • Free and forced vibrations <ul style="list-style-type: none"> ◦ Strings and pipes • Time and frequency domains • damping • Kinetic and potential energy 	<ul style="list-style-type: none"> • <u>Circus of 10 experiments</u>
14	<ul style="list-style-type: none"> • Progressive waves • Graphical descriptions • Longitudinal and transverse • Polarisation of transverse waves 	<ul style="list-style-type: none"> • <u>Circus of 10 experiments</u>
15	<ul style="list-style-type: none"> • Principle of superposition • Stationary waves <ul style="list-style-type: none"> ◦ Strings and pipes • Interference • Coherent sources • Double slit experiment 	<ul style="list-style-type: none"> • <u>Circus of 10 experiments</u>

16	<ul style="list-style-type: none"> Multiple Beam Interference Single slit diffraction pattern 	<ul style="list-style-type: none"> Practical Test 3
17	<ul style="list-style-type: none"> Review 	<ul style="list-style-type: none"> <u>Circus of 10 experiment</u>
18	<ul style="list-style-type: none"> Mass and Energy Nuclear transformations Binding energy Fission and fusion processes 	<ul style="list-style-type: none"> <u>Circus of 10 experiment</u>
19	<ul style="list-style-type: none"> Induced fission Safety aspects Artificial transmutation 	<ul style="list-style-type: none"> Practical Test 4
20	<ul style="list-style-type: none"> Review 	<ul style="list-style-type: none"> <u>Circus of 10 experiment</u>
21	<ul style="list-style-type: none"> Radioactivity α, α^+, α^-, β, EC, nucleon emission inverse square law instability of nuclei 	<ul style="list-style-type: none"> <u>Circus of 10 experiment</u>
22	<ul style="list-style-type: none"> Exponential Processes 2 <ul style="list-style-type: none"> Radioactive decay Time constant, half-life $N = N_0 e^{-\lambda t}$, $A = A_0 e^{-\lambda t}$ $A = -\lambda N$ Radioactive dating 	<ul style="list-style-type: none"> <u>Circus of 10 experiment</u>
23	<ul style="list-style-type: none"> Nature of gamma emission <ul style="list-style-type: none"> Practical applications Probing matter <ul style="list-style-type: none"> Nuclear radius 	<ul style="list-style-type: none"> <u>Circus of 10 experiment</u> 10
24	<p>Turning Points in Physics <u>Discovery of the electron</u></p> <ul style="list-style-type: none"> Cathode Rays Thermionic emission Specific charge 	<ul style="list-style-type: none"> Practical Test 5
25	<ul style="list-style-type: none"> Principle of Millikan's oil drop experiment Significance of Oil drop expt 	
26	<p><u>Wave-Particle Duality</u></p> <ul style="list-style-type: none"> Newton's corpuscular theory Huyghen's wave theory Young's double slit expt 	
27	<ul style="list-style-type: none"> Maxwell's theory of electromagnetism <ul style="list-style-type: none"> Light and Radio Waves Two sticking points: <ul style="list-style-type: none"> Photoelectricity Non agreement with Newtonian Mechanics <p>Einstein's description of photoelectricity</p>	<ul style="list-style-type: none"> Practical Test 6
28	<ul style="list-style-type: none"> Wave-particle duality: de Broglie Electron diffraction 	

		<ul style="list-style-type: none">• Electron microscopy	
29		<u>Special Relativity</u> <ul style="list-style-type: none">• Michelson-Morley Experiment• Einstein's theory of special relativity	<ul style="list-style-type: none">• Practical Test 7
30		<ul style="list-style-type: none">• Time dilation• Length contraction	<ul style="list-style-type: none">• Practical Test 8
31		<ul style="list-style-type: none">• Mass and Energy	<ul style="list-style-type: none">• Practical Test 9
32			
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