

OCR A Level Mathematics – Mechanics 2 Scheme of Work

Examination in June of Year 13

The number of lessons stated is for teaching the unit and is a guide only

PROJECTILES (7 Lessons)

Topic	Syllabus	Text	Lessons
Motion of a projectile	Model motion of a projectile as a particle moving with constant acceleration. Use horizontal and vertical equations of motion to solve problems, including (i) magnitude and direction of v at any time or place (ii) horizontal range (iii) maximum height	M2 Chapter 1.1-1.2 Ex. 1A, pg. 4 Ex. 1B, pg. 11	3-4
	Derive and use Cartesian equation of the trajectory of a particle. Solve problems including ones with initial speed or angle unknown (Teach trigonometric identity $\tan^2 x + 1 = \sec^2 x$ and solving quadratics in \tan – Core 3 syllabus)	M2 Chapter 1.3-1.4 Ex. 1C, Misc. Ex. 1, pg. 17	2-3
Assessment - Projectiles			

IMPULSE AND COEFFICIENT OF RESTITUTION (5 lessons)

Topic	Syllabus	Text	Lessons
Impulse	Know and use impulse is change in momentum, distinguish between instantaneous impulse and the product of force and time.	M2 Chapter 7.1-7.2 Ex. 7A, pg. 124	1-2
Coefficient of restitution	Understand the definition of coefficient of restitution and know that $0 \leq e \leq 1$ Understand the meaning of ‘perfectly elastic’ ($e=1$) and ‘inelastic’ ($e=0$) Know and use Newton’s experimental law to solve problems that model direct impact of 2 smooth spheres or 1 sphere with a fixed surface.	M2 Chapter 7.3-7.6 Ex. 7B, pg. 133	2
*Motion	*Harder problems on motion	M2 Chapter 11.2 Ex. 11B, pg. 195	*Ext. work
Assessment – Impulse and coefficient of restitution			

CENTRE OF MASS (5-7 lessons)

Topic	Content	Text	Lessons
Centre of Mass	Identify position of c of m of a uniform body by symmetry. Using weighted mean in 1D and 2D to find the position of the c of m	M2 Chapter 5.1-5.2 Ex. 5A, pg. 77	2
	Use information about c of m of uniform 2D wire and lamina shapes, find c of m of simple composite shapes.	M2 Chapter 10.1-10.2 Ex.10A, pg. 173	1
	Use information about c of m of uniform 3D solid and shell shapes. Find the c of m of a composite rigid body including the subtraction method.	M2 Chapter 10.3-10.5 Ex. 10B, Misc. Ex.10, pg. 179	2
Assessment – Centre of Mass			

UNIFORM MOTION IN A CIRCLE (5-6 lessons)

Topic	Syllabus	Text	Lessons
Uniform motion in a circle	Angular speed for a particle in a circle including using $v=r\omega$	M2 Chapter 8.1-8.2 Ex. 8A, pg.143	1
	Understand that acceleration of a particle with constant speed is towards the centre of the circle Use $a = r\omega^2$ and $a = \frac{v^2}{r}$	M2 Chapter 8.3-8.4 Ex. 8B, pg. 147	1
	Solve problems modelled by a particle in a horizontal circle with constant speed	M2 Chapter 8.5 Ex. 8C, Misc. Ex. 8, pg. 151	2
Assessment – Motion in a circle			

EQUILIBRIUM OF A RIGID BODY (10 Lessons)

Topic	Content	Text	Lessons
Equilibrium of a rigid body	Rigid bodies. Know that the effect of gravity on a rigid body is equivalent to a single force acting at the c of mass Calculating the moment of a force in 2D	M2 Chapter 4.1-4.3 Ex. 4A, pg. 56	1-2
	Knowing that a rigid body is in equilibrium if (i) vector sum of forces is zero (ii) sum of moments about any point is zero	M2 Chapter 4.4 Ex. 4B, pg. 60 ref. M1 Chapters 9-10	1-2
	Solving problems involving equilibrium of a single rigid body under coplanar forces (moments only) Using both equations of equilibrium	M2 Chapter 4.5 Ex. 4C, Misc. Ex. 4, pg.66 M2 Chapter 6.1 Ex.6A, pg. 97	3-4
	Solving problems involving breaking equilibrium by sliding or toppling	M2 Chapter 6.2 Ex. 6B, Misc. Ex. 6	2
	*Harder problems on equilibrium	M2 Chapter 11.1 Ex. 11A, pg. 189	*Ext. work
Assessment – Equilibrium of a rigid body			

ENERGY, WORK & POWER (10 LESSONS)

Topic	Syllabus	Text	Lessons
Work	Work done by a force. Calculate work done when point of application moves	M2 Chapter 2.1-2.3 Ex.2A, pg. 26	1
Power	Use power as the rate at which a force does work. Use relationship between power, force and velocity for a force acting in the direction of motion	M2 Chapter 2.4-2.5 Ex. 2B, Misc. Ex. 2, pg. 30	2
Potential energy Kinetic energy	Understand concepts of gravitational potential energy and kinetic energy and use appropriate formulae Understand relationship between work done and change in energy Use principle of conservation of energy appropriately.	M2 Chapter 3.1-3.4 Ex. 3A,pg. 41 M2 Chapter 3.5-3.6 Ex.3B, Misc. Ex.3, pg. 45	3
Kinetic energy in collisions	Understand the effects of collision and the coefficient of restitution on the kinetic energy and the principle of conservation of energy.	M2 Chapter 7.7-7.8 Ex. 7C, Misc. Ex. 7, pg. 138	2
	*Harder problems on energy and momentum	M2 Chapter 11.3 Ex. 11C, Misc. Ex. 11, pg. 202	*Ext. work
Assessment – Energy, Work, Power			

ASSESSMENTS

Students should complete an assessment test at the end of each unit of work. Marks for these assessments should be recorded on G4S as soon as they are complete.