Unit M1
Mechanics 1

Candidates will be expected to be familiar with the knowledge, skills and understanding implicit in Units C1 and C2.

Candidates will also be expected to use appropriate mathematical modelling techniques and be aware of underlying modelling assumptions.

Topics	**Notes**
1. Rectilinear motion.	
Motion under uniform acceleration.	Candidates may quote the equations of uniformly accelerated motion. To include the sketching and interpretation of velocity-time graphs.
Vertical motion under gravity.	The value 9.8 ms^{-2} will be used for the acceleration due to gravity.
2. Dynamics of a particle.	

Newton's Laws of Motion.	Forces will be constant and will include weight, friction, normal reaction, tension and thrust.
	To include problems on lifts.
	To include motion on an inclined plane.
	The motion of particles connected by strings passing over fixed pulleys or pegs; one particle will be freely hanging and the other particle may be
	      (i) freely hanging,
	      (ii) on a horizontal plane,
	      (iii) on an inclined plane.

3. Friction.	
Laws of friction. Coefficient of friction. Limiting friction.	Use of $F \le \mu R$. No distinction will be made between the coefficients of dynamic and static friction.

Topics	**Notes**

4. Momentum and impulse.
Conservation of momentum.

Problems will be restricted to the
one-dimensional case.

Newton's Experimental Law for
(i) the direct impact of two bodies moving in
the same straight line,
(ii) the impact of a body moving at right-
angles to a plane.

5. Statics

Composition and resolution of forces.

Equilibrium of a particle under the action of
coplanar forces which may include friction.

Candidates will be expected to know that,
when particle is in equilibrium, the sum of the
resolved parts of the forces acting on the
particle in any direction is zero.

The moment of a force about a point.

Equilibrium of a rigid body under the action of
parallel coplanar forces.

Centre of mass of a coplanar system of
particles.

Candidates will be expected to be familiar
with the term 'centre of gravity'.

Centre of mass of uniform laminae: triangles,
rectangles, circles and composite shapes.

The use of integration is **not** required.

Simple cases of equilibrium of a plane lamina
or a coplanar system of particles connected by
light rods.

The lamina or system of particles may be
suspended from a fixed point.