MODELLING IN MECHANICS

KEY WORDS & DEFINITIONS

1. **Model** — A mathematical system which enables a problem to be solved
2. **Light** — Has negligible mass
3. **Static** — Not moving
4. **Rigid** — Doesn't bend
5. **Thin** — Has negligible thickness
6. **Smooth** — Has a surface that results in no friction between itself and an object
7. **Rough** — Has a surface that requires frictional forces between itself and an object to be considered
8. **Particle** — Dimensions are negligible, so mass or object is at a point. Rotational forces and air resistance can be ignored.
9. **Rod** — A long, thin, straight object. Mass is along a line that is rigid.
10. **Lamina** — A thin 2-dimensional surface with mass distributed evenly across its flat surface.
11. **Uniform Body** — Mass is distributed evenly, so acts at the centre of mass.
12. **Light string** — Has negligible mass and equal tension at both ends.
13. **Inextensible string** — A string that does not stretch so that connected objects can move with the same acceleration if the string is taut.
14. **Wire** — A rigid, thin length of metal.
15. **Smooth and Light Pulley** — A pulley that has no mass and results in tension being equal on either side.
16. **Bead** — A particle with a hole in it which can freely move along a wire or string, resulting in equal tension either side of the bead.
17. **Peg** — A supporting object that is dimensionless and fixed but may be rough or smooth.
18. **Air Resistance** — The resistance force as experienced as on object moves through the air, which is often modelled as negligible.
19. **Gravity** — The force of attraction between objects.
20. **Earth's Gravity** — Assumed to apply to all objects with mass. Acts uniformly and vertically downwards with a value of $9.8 m/s^2$
21. **Scalar** — A quantity which has magnitude only — distance, speed, time, mass. Always positive.
22. **Vector** — A quantity which has magnitude and direction — displacement, velocity, acceleration, force, weight. Can be described using column or i j notation. Can be positive or negative.

Distance is the magnitude of the displacement vector

Speed is the magnitude of the velocity vector

SI BASE UNITS

Quantity	Mass	Length/ Displacement	Time	Speed/ Velocity	Acceleration	Weight/ Force
Symbol	kg	m	s	ms^{-1}	ms^{-2}	N ($= kgms^{-2}$)