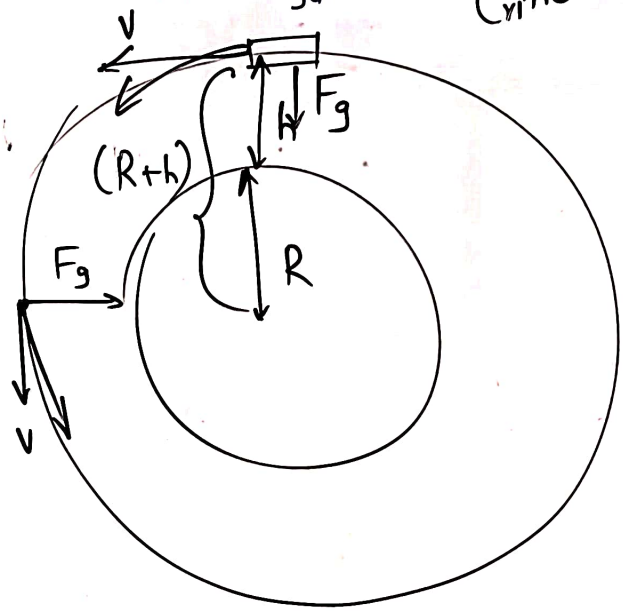
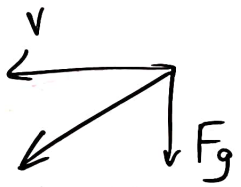
Orbits of Artificial Satellite.

Critical Velocity (V_c)





Centripetal Force = Gravitational Force.

$$F_c = F_g$$

$$\frac{mv_c^2}{(R+h)} = \frac{GMm}{(R+h)^2}$$

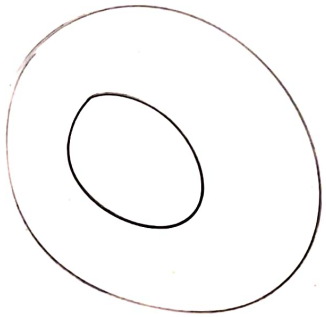
$$v_c^2 = \frac{GM}{(R+h)}$$

$$v_c = \sqrt{\frac{GM}{R+h}}.$$

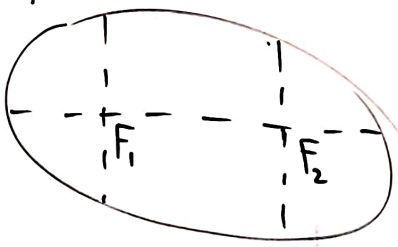
Types of Orbits

Based on Shape

① Circular

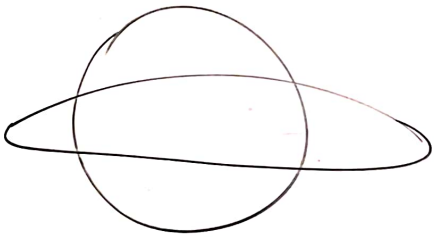


② Elliptical

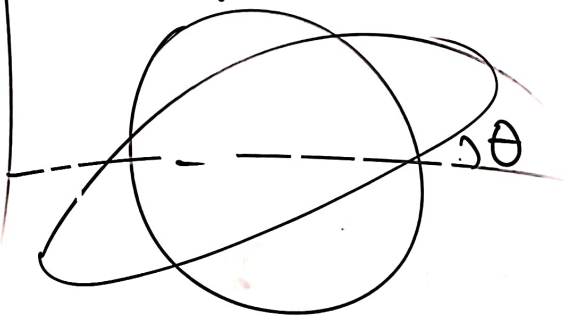


Based on Alignment

① Parallel to Equator



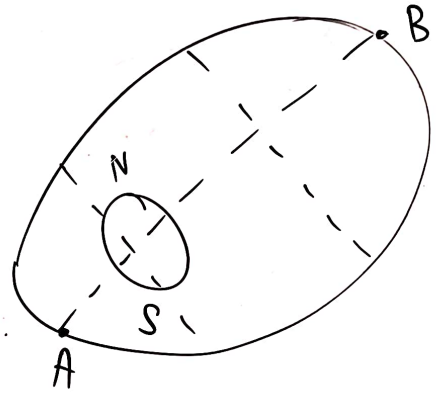
② At an angle to equator



Types of Orbits

① Low Earth orbit (h = 180 km to 2000 km)
(T = 90 mins)

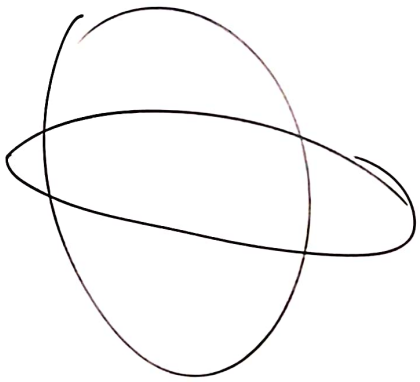
② Medium Earth Orbit (h = 2000 km to 35,780 km)
(T = 2 to 24 hrs)



Type of Orbits

③ High Earth Orbit ($h > 35780$ km)
($T \approx 24$ hrs)

Geosynchronous	Geostationary
$T = 24$ hrs	$T = 24$ hrs



35,780 km

Escape velocity (v_{esc})

$$V_c = \sqrt{\frac{2GM}{R}}$$

$$V_{esc} = 11.18 \text{ km/s}$$

$$\approx 11.2 \text{ km/s}$$