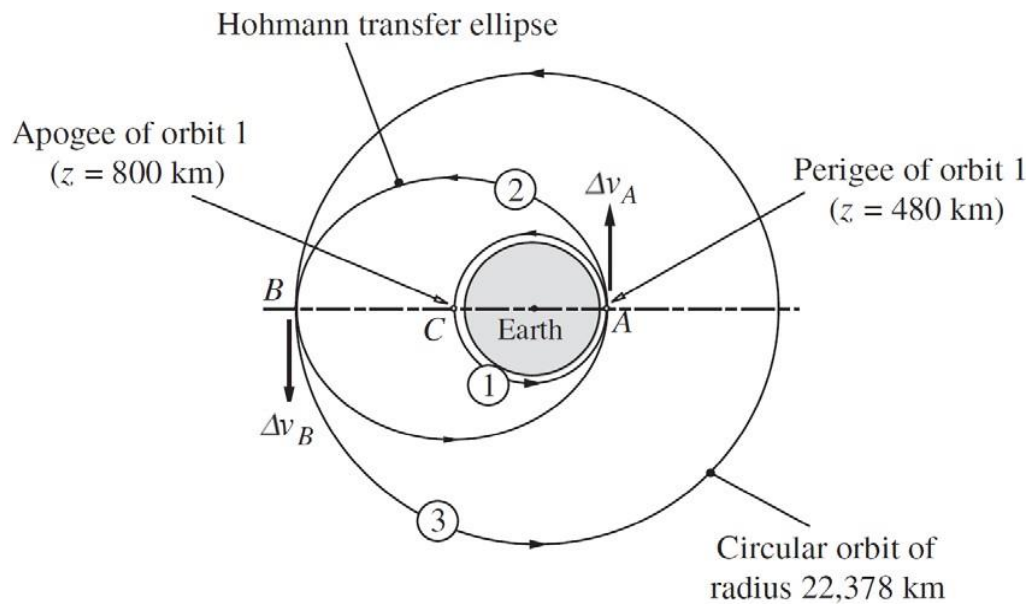


- A 2000 kg spacecraft is in a 480×800 km Earth orbit ①
- (a) find the Δv at perigee A to place the spacecraft in a 480×16000 km transfer ellipse ②
- (b) find the Δv at apogee B to establish a circular orbit of 16000 km ③
- (c) find the total amount of propellant if the specific impulse is 300 s



- Each impulsive maneuver results in change of Δv in velocity.
- Change in the magnitude (pumping) direction (cranking)
- The magnitude of Δv is related the mass propellant consumed Δm

$$\frac{\Delta m}{m} = 1 - e^{-\frac{\Delta v}{I_{sp} g_0}} \quad (6.1)$$

Propellant consumption Δm
 Mass of the SC before burn m
 Velocity increment Δv
 Sea level standard gravitational acceleration g_0
 Specific impulse I_{sp}

$$I_{sp} = \frac{T}{\dot{m}_e g_0}$$

Thrust T
 Mass rate of fuel consumption \dot{m}_e