Which statement on the gravity assist is FALSE?

A	The magnitude of the arrival and departure hyperbolic excess velocity are the same at t he SOI	0
B	The magnitude and direction of the heliocentric velocities before and after flybys are di fferent	0
C	The magnitude and direction of the heliocentric velocities before and after flybys are th e same	0 ✓
D	The geometry of the flyby defines whether the heliocentric velocity will be increased or d ecreased	0

Which statement on the gravity assist is FALSE ?

A	The heliocentric trajectory of a spacecraft can be deflected	0
B	The magnitude of the heliocentric velocity is changed	0
C	Significant delta v savings can be made with respect to a Hohman transfer	0
D	Time of flight to the destination is always shorter than Hohman transfer	0 ✓

In a simple Moon trajectory where we neglect the Moon's gravity, what is the orbit's minimum eccentricity to reach the Moon from a ~320 km altitude parking orbit?

A	e~0.5	0
B	e~0.97	0 ✓
C	e~1.2	0
D	There is no constraint on the eccentricity	0

In a simple Moon trajectory where we neglect the Moon's gravity, what is the minimum injection speed?

A	v is slightly less than the escape velocity	0 ✓
B	v must be larger than the escape velocity	0
C	v ~7.7 km/s	0
D	v ~1 km/s	0

What is a free-return trajectory?

A	A trajectory with a powered flyby of the Moon which implies a geocentric hyperbolic orbit	0
B	A trajectory around the Moon that requires no delta v at perilune to return to the Earth	0 ✓
C	There is no such thing as a free-return trajectory	0
D	The return trajectory on a parabolic orbit to the Moon's SOI	0

Which of these equations is not a form of the Tsiolkovsky equation?

A .

$$\Delta v = v_e \ln\left(\frac{m_i}{m_f}\right)$$

0

B .

$$\Delta v = I_{sp} g_0 \ln\left(\frac{m_i}{m_f}\right)$$

0

C .

$$m_p = m_i\left[1 - exp\left(-\frac{\Delta v}{I_{sp} g_0}\right)\right]$$

0

D .

$$I_{sp} g_0 = v_e$$

0 ✓

Which statement on the Isp is false?

A	It is the thrust / Sea-level weight of flow consumption ratio	0
B	It is the amount of seconds a given propellant can accelerate its own initial mass at g0	0
C	A high Isp always implies a high thrust	0 ✓
D	It is an important performance parameter for a given engine/propellant combination	0
E	The Isp and the thrust F are large if and only if the mass flow (mdot) is large	0

What is the fraction of propellant mass w.r.t. the total mass for a ~10 km/s Delta v (which corresponds to Delta v needed to reach LEO from the surface) ?

A	10%	0
B	90%	0 ✓
C	50%	0
D	25%	0

What are the typical values of Isp and thrust for electrical propulsion?

A	2500s/5mN	0 ✓
B	327s/2.75MN	0
C	450s/1MN	0
D	800s/220kN	0