Slide 31, Hohmann transfer (cnt'd), question 1

Answers **(DID YOU TRY??):**

a) $a = 0.6935$ AU = 103.7×10^6 km; $e = 0.442$
b) $T_H = 9.11 \times 10^6$ sec = 0.289 yrs
c) V_∞(Earth) = 7.535 km/s; V_∞(Mercury) = 9.615 km/s
d) V_c(Earth) = 7.613 km/s; V_c(Mercury) = 2.738 km/s
e) ΔV(Earth) = 5.528 km/s; ΔV(Mercury) = 7.627 km/s; ΔV_{tot} = 13.155 km/s

Slide 32, Hohmann transfer (cnt'd), question 2

Answers **(DID YOU TRY??):**

a) $a = 3.360$ AU = 502.7×10^6 km; $e = 0.548$
b) $T_H = 9.72 \times 10^7$ sec = 3.080 yrs
c) V_∞(Mars) = 5.895 km/s; V_∞(Jupiter) = 4.276 km/s
d) V_c(Mars) = 3.315 km/s; V_c(Jupiter) = 32.293 km/s
e) ΔV(Mars) = 4.217 km/s; ΔV(Jupiter) = 13.576 km/s; ΔV_{tot} = 17.793 km/s

Slide 37, Timing (cnt'd), question 3

Answers **(DID YOU TRY??):**

a) $T_E = 3.16 \times 10^7$ s = 1.000 yr
b) $T_S = 9.30 \times 10^8$ s = 29.468 yr
c) See sheet 36. $1/T_{syn} = abs(1/T_1 - 1/T_2)$
d) T_{syn} = 1.035 yr
e) $T_{NEO} = 3.40 \times 10^7$ s = 1.076 yr
f) T_{syn} = 14.171 yr
g) Object moving fastest around Sun dictates synodic period (slow one is standing still, relatively speaking)

Slide 42, Timing (cnt'd), question 4

Answers **(DID YOU TRY??):**

a) See two sheets ago.
b) $T_H = 9.68 \times 10^8$ s = 30.661 yr.
c) t_1 = -64.5 days, i.e., about October 28, 2009.
d) t_2 = 11,134.5 days, i.e., 30.485 years after January 1, 2010, i.e., about June 26, 2040.
e) Yes, by waiting for (an integer times the) synodic period.

Slide 48, Timing round-trip missions (cnt'd), question 6

Answers **(DID YOU TRY??):**

a) $T_H = 1.908 \times 10^8$ sec = 6.047 yr
b) See derivation on sheet 61.
c) See derivation on sheet 61.
d) T_{stay} minimum = 2.963×10^7 sec = 0.939 yr (for N=12)

Slide 49, Timing round-trip missions (cnt'd), question7

Answers **(DID YOU TRY??):**

a) $T_H = 9.113 \times 10^6$ sec = 0.289 yr
b) See derivation on sheet 61.
c) See derivation on sheet 61.
d) T_{stay} minimum = 5.779×10^6 sec = 0.183 yr (for N=-1)

Slide 58, Gravity assist (cnt'd), question 8

Answers **(DID YOU TRY??):**

a) a = -1,267,000 km; e = 1.158;
b) $V_{Jupiter}$ = 13.061 km/s;
c) See sheet 68.
d) See sheet 69.
e) $V_{sat,1}$ = 6.707 km/s; $V_{sat,2}$ = 22.276 km/s;
f) $\Delta E = 225.611\ km^2/s^2$.