

**ENAE 483/788D CREW SYSTEMS SPECIALTY PROBLEMS – FALL, 2024**

- (1) Calculate the decompression R-values for each of the following transitions
  - (a) From Earth sea level (14.7 psi, 21% O<sub>2</sub>) to a lunar habitat (10.2 psi, 34% O<sub>2</sub>)
  - (b) From a lunar habitat (10.2 psi, 34% O<sub>2</sub>) to a Shuttle-type pressure suit (4.3 psi, 100% O<sub>2</sub>)
  - (c) From a habitat at Earth sea level pressure (14.7 psi, 21% O<sub>2</sub>) to an Russian Orlan pressure suit at Stage I (6.7 psi, 100% O<sub>2</sub>)
  - (d) From a habitat at Earth sea level pressure (14.7 psi, 21% O<sub>2</sub>) to an Russian Orlan pressure suit at Stage II (5.8 psi, 100% O<sub>2</sub>)
  - (e) From a habitat at Earth sea level pressure (14.7 psi, 21% O<sub>2</sub>) to an “zero pre-breathe” pressure suit (8.3 psi, 100% O<sub>2</sub>)
- (2) You would like to generate 0.5 Earth gravity (4.9 m/sec<sup>2</sup>) in the transit habitat for the trip to and from Mars.
  - (a) If the crew can tolerate 3 rpm, what is the required radius of the spinning habitat?
  - (b) The habitat has two decks, 2.5 m apart. If the system is designed to provide 0.5 Earth gravity at the floor of the upper deck, what is the gravity at the floor of the lower deck?