

Practice Questions, Ch.12, 13,14

Chapter 12

1. An object that is orbiting the Earth at a height of three Earth radii from the center of the Earth has a weight of 1.00 N. What is the mass of this object?
 - a. 0.102 kg
 - b. 0.306 kg
 - c. 0.92 kg
 - d. 1.0 kg
2. An object of mass 0.5 kg is transported to the surface of Planet X where the object's weight is measured to be 20 N. The radius of the planet is $4 * 10^6$ m. What is the mass of Planet X ?
 - a. $13.3 * 10^{19}$ kg
 - b. $16.6 * 10^{22}$ kg
 - c. $9.6 * 10^{24}$ kg
 - d. $21.4 * 10^{25}$ kg
3. A satellite is in a circular orbit about the Earth at a distance of one Earth radius above the surface. What is the velocity of the satellite? (The radius of the Earth is 6400 km and the mass of the Earth is $5.98 * 10^{24}$ kg)
 - a. 2,835 m/s
 - b. 4,210 m/s
 - c. 5,625 m/s
 - d. 16,870 m/s

Chapter 13

4. A 0.2 kg object, suspended from a spring with a spring constant of $k = 10$ N/m, is moving in simple harmonic motion and has an amplitude of 0.08 m. What is its velocity at the instant when its displacement is 0.04 m ?
 - a. 9.8 m/s
 - b. 4.9 m/s
 - c. 49.0 cm/s
 - d. 24.5 cm/s

5. A mass on a spring vibrates in simple harmonic motion at a frequency of 4.0 Hz and an amplitude of 8.0 cm. If a timer is started when its displacement is a maximum (hence $x = 8 \text{ cm}$ when $t = 0$), what is the displacement of the mass when $t = 3.7 \text{ s}$?
- a. zero
 - b. 0.025 m
 - c. 0.036 m
 - d. 0.080 m
6. A pendulum with a period of 5 s and a mass of 500 g is displaced by 5 cm to one side. How fast will it go when passing through the minimum of the simple harmonic motion
- a. 0.026 m/s
 - b. 0.054 m/s
 - c. 0.063 m/s
 - d. 0.087 m/s

Chapter 14

7. If a radio wave has speed $3 * 10^8 \text{ m/s}$ and frequency 94.7 Mhz, what is its wavelength?
- a. 8.78 m
 - b. 1.20 m
 - c. 2.50 m
 - d. 3.17 m
8. You stand by the railroad tracks as a train passes by. You hear a 1000 Hz frequency when the train approaches, which changes to 800 Hz as it goes away. How fast is the train moving?
- a. 15.67 m/s
 - b. 21.17 m/s
 - c. 28.0 m/s
 - d. 37.78 m/s
9. A sound source with 1000 Hz frequency moves at 50.0 m/s toward a listener who is at rest. What is the apparent frequency heard by the listener? (velocity of sound=340 m/s)
- a. 853 Hz
 - b. 872 Hz
 - c. 1150 Hz
 - d. 1170 Hz