

29:52 Exploration of the Solar System

Homework Assignment # 11

Quiz must be completed on ICON by 8 AM, Friday May 7

1. Why don't we have meteorites that come from the Perseid meteor shower in August?
 - (a) the meteors of the Perseid meteor shower stay outside of the Earth's atmosphere
 - (b) the particles that produce the Perseid meteors are too small to leave a residue
 - (c) meteor shower meteors are pieces of comets and are made of ice
 - (d) the Perseid meteors are an electromagnetic phenomenon rather than bits of solid matter

2. Look at Figure 15.4 of your book. Assume that the "meteoroid swarm" orbits in a counterclockwise sense, and that we see meteors when the Earth is at the leftmost of the two intersections of the Earth's orbit with that of the meteoroid swarm. What time of day would be the best for seeing this meteor shower?
Hint: Think of when the radiant would be highest in the sky.
 - (a) in the afternoon
 - (b) around sundown
 - (c) in the late evening, before midnight
 - (d) very late at night, after midnight
 - (e) as the Sun is rising at dawn

3. What is the difference between a meteor and a meteorite?
 - (a) a meteorite is a piece of a meteor that survives passage through the Earth's atmosphere
 - (b) a meteor is an astronomical phenomenon; meteorites originate in the Earth's atmosphere
 - (c) meteors are stony or iron objects; meteorites are made of ice
 - (d) meteor is the term used prior to the 20th century for the phenomenon; meteorite is the modern scientific term
 - (e) meteors occur on Earth. Meteorites are analogous phenomena which occur at Jupiter

4. Roughly what is the orbital period of an asteroid in the asteroid belt?
 - (a) 0.3 - 1 years
 - (b) 1-2 years
 - (c) 2-8 years

- (d) 12-30 years
 - (e) greater than 30 years
5. Which of the following objects is an asteroid?
- (a) Mercury
 - (b) Ceres
 - (c) Europa
 - (d) Titan
 - (e) Eris
6. Why are there essentially no asteroids with periods of 3.95 years?
- (a) Those asteroids are in a 3:1 resonance with Jupiter
 - (b) Asteroids with periods that long would be far outside the asteroid belt
 - (c) Asteroids with periods that short would be far inside the asteroid belt
 - (d) Orbits of asteroids are so highly perturbed that they do not have well-defined orbital periods
 - (e) The only known asteroids have periods less than 2 years
7. Here's a fun one. Consider the list of imaginary asteroids below. For each one, I give the semimajor axis (a) and the eccentricity of the orbit (e). Assume that for all of them, the orbit lies in the plane of the ecliptic. Which one could potentially impact the Earth?
- (a) Stultus: $a = 1.2$ au, $e = 0.10$
 - (b) Vultus Amentis: $a = 0.5$ au, $e = 0.80$
 - (c) Loquacior: $a = 3.0$ au, $e = 0.50$
 - (d) Inimicus Mundi: $a = 2.0$ au, $e = 0.60$
 - (e) Amicus Perfidens: $a = 6.0$ au, $e = 0.35$
8. How is heat carried in the outermost layers of the Sun (below the photosphere)?
- (a) conduction
 - (b) convection
 - (c) radiation
 - (d) dissipation
 - (e) propagation
9. Astronomers have classified stars into a set of classes. They can assign the Sun to one of these classes. Which is it?
- (a) A0V
 - (b) M2I
 - (c) G2V

- (d) K3IV
- (e) O3III

10. Look at Figure 17.29 of your book. Using the information in this picture, together with other data you can find in your book, roughly estimate how high the prominence extends above the surface of the Sun.

- (a) 700,000 km
- (b) 540 km
- (c) 150 million kilometers
- (d) 7.5 million kilometers
- (e) 350,000 km