

Name: _____ Date: _____
Astro 129, Fall 2014, Homework on chapter 12

1. What is the relationship between the Kirkwood Gaps in the asteroid belt and the Cassini and Enke divisions in the rings of Saturn?
 - A) Both are caused by large objects passing through swarms of smaller objects, sweeping out gaps in the swarms.
 - B) Both were discovered by observers from the same group—Kirkwood and Enke worked at the Cassini Observatory.
 - C) Both are caused by selective melting of material at these specific locations from the central radiating body, the Sun and Saturn respectively.
 - D) Both are caused by disruptions of orbits of small objects by a larger object whose orbital period is a simple ratio of that of the small objects.

2. What is the likely connection between the metal iridium and the demise of Earth's dinosaur population?
 - A) Iridium, which is found in abundance on Earth's surface, is poisonous to reptiles.
 - B) Iridium is found beneath Earth's crust. Meteor impacts during the dinosaur age probably exposed and uncovered enough of it to poison the dinosaurs.
 - C) Iridium is found in meteorites but is rare on Earth. The existence of a world-wide layer of it suggests a large meteor impact during the dinosaur age. This probably raised enough dust to block out sunlight and kill the dinosaurs.
 - D) Iridium is highly radioactive. Its presence in a geologic layer dating to the dinosaur age suggests that natural radioactivity reached dangerous levels at that time, and the dinosaurs died from overexposure.

3. The fact that there are several distinct and different types of processed meteorites (metal-rich and rocky) is probably indicative of
 - A) preferential accretion of iron particles to other iron particles because of their magnetic properties, leaving stony particles to accrete separately.
 - B) fragmentation of asteroids that had become differentiated in a similar fashion to Earth (with the heavier iron sinking to the center).
 - C) different amounts of heating and “erosion” of the outer layers of meteorites as they pass through Earth's atmosphere.
 - D) formation in different parts of the early solar nebula, with stones condensing closer to the Sun and irons farther out.

4. Perhaps the most interesting material to be found inside rocks that have come to us from outer space is
- A) radioactive material.
 - B) amino acids or proteins.
 - C) carbon.
 - D) pure iron.
5. The Allende meteorite contained a large abundance of ^{26}Mg , an isotope of magnesium. What is the significance of this?
- A) Magnesium has a high melting point, so the asteroid of which Allende was originally a part must have formed in the inner part of the Solar System.
 - B) ^{26}Mg is radioactive, and the sample was probably produced in a nearby supernova explosion about the time the Solar System was formed.
 - C) ^{26}Mg is the stable product of the decay of radioactive ^{26}Al . The ^{26}Al from which the ^{26}Mg formed was probably produced in a nearby supernova explosion about the time the Solar System was formed.
 - D) This discovery suggests that heavy elements such as magnesium were more abundant in the early Kuiper Belt than we had originally thought.
6. Which of the following governs the direction in which a comet's ion tail is aligned in space?
- A) its direction of motion, because the tail simply trails behind it in its orbit
 - B) the gravitational attraction of the Sun for the tail material
 - C) the gravitational attraction of Earth for the tail material
 - D) the flow of solar wind past the comet's nucleus
7. The most likely origin of the “dirty snowballs” that become long-period comets when deflected into orbits bringing them closer to the Sun, is
- A) the Oort cloud surrounding the Solar System.
 - B) the surfaces of the moons of Jupiter and Saturn.
 - C) the gas clouds in the Milky Way.
 - D) the asteroid belt.
8. A meteor shower occurs when
- A) Earth passes through the asteroid belt.
 - B) the head of a comet hits Earth's atmosphere.
 - C) a meteor is about to get married.
 - D) Earth passes through a swarm of dust particles in space.