Sample Second Exam Questions

Astronomy 1010 Prof. Paul J. Wiita

Try to answer each question by yourself. Mark your answers AND the correct ones I will give you during class on Thursday the 22nd on this sheet; use it while studying for the exam on the 27th.

A statement is true if and only if all parts of it are true.

1. A CCD (charge coupled device) is more linear than film, and is therefore preferred for accurate measurements of brightness.

2. Jupiter is about 11 the radius of the Earth and about 100 times its mass.

3. Radioactive decay allows us to date rocks on the earth back to about 4 billion years but lunar rocks older than that were brought back by Apollo astronauts.

4. Most large optical telescopes are reflectors, not refractors, and spend most of their time making images of planets, stars and galaxies.

5. The earth’s magnetic field is generated in its mantle.

6. A photon with a wavelength in vacuum of 5.0 \times 10^{-5} \text{cm} has twice the energy of one with a wavelength in vacuum of 2.5 \times 10^{-5} \text{cm}

7. Kirchhoff’s laws include the idea that a liquid basically produces a continuum thermal spectrum.

8. When a photon interacts with an atom, a second photon of the same frequency may be emitted if the atom was already excited.

Circle the letter corresponding to the best answer to the question or the best way to complete the statement.

9. Which of the following is true of the continuous spectrum emitted from a body at about 293K (68F)?
   A. It emits electromagnetic radiation at all wavelengths, but the emission peaks in the visible.
   B. It emits electromagnetic radiation at all wavelengths, but the emission peaks in the IR.
   C. It emits mostly visible radiation
   D. It only emits IR and radio photons.
   E. It mainly emits X-rays.

10. If the half-life of an isotope is 30 yrs, and you start out with a sample of 1,000 atoms of that isotope, about how many will be left after 90 years?
    A. 0
    B. 500
    C. 250
    D. 125
    E. 63

11. The solar nebula condensed to form planetesimals in a flattened disk because of
    A. the law of conservation of angular momentum
    B. Newton’s law of gravity
    C. collisions between planetesimals tend to lose momentum perpendicular to the disk plane
    D. A. and B. are both important
    E. All of A, B., and C. are important

12. A mountain top is a good location for optical and infrared telescopes because the site
    A. is above much of the atmosphere
    B. is closer to astronomical objects
    C. has cold weather which improves the performance of all instruments
    D. all of A., B. and C.
    E. none of A., B. and C.

13. Planet A has twice the radius of planet B, but only 1/2 B’s surface temperature (assume neither has an atmosphere). Therefore the ratio of the luminosity of A to that of B \( \frac{L_A}{L_B} \) is:
    A. 16
    B. 4
    C. 1
    D. 1/4
    E. 1/16