

HOMework #1

NOTES:

You will need a calculator, a pencil, and a standard scantron.

Each question has one correct answer. Choose the best answer for each. Mark your answer on the scantron.

This homework is due at the beginning of class on February 9. Late homeworks will not be accepted.

1. Aristotle inferred that
 - a) the Earth is spherical because the Earth's shadow is always a stripe across the Moon.
 - b) the Earth is spherical because different constellations could be seen from different latitudes.
 - c) the Earth is flat because the Earth's shadow is always curved across the Moon.
 - d) the Earth is flat because different constellations could be seen from different latitudes.

2. Where on Earth would you be if Polaris was at your zenith?
 - a) North Pole
 - b) South Pole
 - c) Tropic of Cancer
 - d) Equator
 - e) It lies overhead everywhere on Earth

3. What curve on the celestial sphere is created by our revolution around the Sun?
 - a) Equator
 - b) Prime Meridian
 - c) Analemma
 - d) Ecliptic
 - e) Galactic Plane

4. The Earth's orbit is nearly a circle of 1 AU radius. Suppose the orbit of Mars could be approximated as a circle of 1.5 AU radius. Compare the angular size of Mar at opposition to its size at conjunction. (Hint: Draw a figure. The answer is a ratio. Look up the formula for angular size of an object.)
 - a) Mars is 1.5 times larger in appearance at opposition.
 - b) Mars is 1.5 times smaller in appearance at opposition.
 - c) Mars is 5 times bigger in appearance at opposition.
 - d) Mars is 5 times smaller in appearance at opposition.
 - e) The apparent size of Mars never changes.

5. An order of magnitude problem, find out roughly how many stars are visible to the unaided eye on a clear night from a dark sight?
- a) dozens
 - b) hundreds
 - c) thousands
 - d) millions
 - e) billions
6. What Greek composed a model of the Earth-Moon-Sun system that most closely resembles our modern model?
- a) Pythagoras
 - b) Hipparchus
 - c) Ptolemy
 - d) Erasthenes
 - e) Aristarchus
7. Imagine a planet with semi-major axis of $a = 14$ AU. What is its orbital period in years?
- a) 21 years
 - b) 14 years
 - c) 6 years
 - d) 52 years
 - e) 28 years
8. The force of gravity between two objects
- a) increases with the masses, but decreases with their separation.
 - b) increases with the masses, but decreases with the square of their separation.
 - c) increases with the cube of their masses, but decreases with their separation.
 - d) decreases with the masses, and decreases with their separation.
 - e) decreases with the masses, but increases with the square of their separation.
9. There is a force of gravity from the Earth acting on you.
- a) This force is bigger than the force of gravity acting on the Earth because of you.
 - b) This force is smaller than the force of gravity acting on the Earth because of you.
 - c) There is no force of gravity acting on the Earth because of you.
 - d) This force is equal to the force of gravity acting on the Earth because of you.
10. What is 43,040 in scientific notation?
- a) 4.304×10^3
 - b) 4.304×10^4
 - c) 4.304×10^5
 - d) 4.304×10^6
 - e) 4.304×10^7

11. Suppose that $y = x^3 - 16$ and $y = 4$. Determine the value of x .
- a) -4
 - b) 48
 - c) 0
 - d) 80
 - e) 64
12. Which planet cannot be at opposition?
- a) Mars
 - b) Venus
 - c) Saturn
 - d) Jupiter
 - e) Neptune
13. Which of the following is radiation typical of sources that are millions of degrees hot?
- a) X-rays
 - b) ultraviolet
 - c) radio
 - d) visible
 - e) infrared
14. If you quadruple the temperature of a blackbody, what will happen to its brightness?
- a) Increase by 256 times.
 - b) Decrease by 256 times.
 - c) Increase by 16 times.
 - d) Decrease by 16 times.
 - e) Increase by 8.
15. A radio beam is sent to Venus, which is reflected by its surface. One side of Venus shows a redshift, and the other a blueshift. This tells you that
- a) Venus is moving toward us.
 - b) Venus is moving away from us.
 - c) Venus is falling into the Sun.
 - d) Venus is periodically expanding and shrinking.
 - e) Venus is rotating.
16. The three laws dealing with the appearance of spectra are named after
- a) Newton.
 - b) Fraunhofer.
 - c) Kirchoff.
 - d) Bohr.
 - e) Kepler.

17. What is “seeing”?
- a) The faintness limit of a telescope.
 - b) The brightness limit of a telescope.
 - c) The spectral resolution of a spectroscope.
 - d) A limit to the crispness of images owing to air stability.
 - e) The range of electromagnetic radiations that penetrate the atmosphere.
18. Determine the distance from the Sun at which an object would be in synchronous orbit with the Sun’s rotation period of 25 days. (Can use Kepler’s 3rd law.)
- a) 1 AU
 - b) 36 solar radii
 - c) 25 AU
 - d) 42,000 km
 - e) 3.8 solar radii