

PHY101: The Heavens and the Earth
Fall 2018 Test 2
No calculators; exam time: 50 min.
Exam, Form: A

Name: _____
Student Number: _____
TA: _____
Date: _____

Section 1. Matching of scientific terms and concepts (5 pts.)

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|----------------------|---|
| _____ tenable | (a) the soft glowing light from the sky when the sun is below the horizon |
| _____ twilight | (b) state a fact or belief confidently and forcefully |
| _____ melodious | (c) impressive or magnificent in appearance or style, especially pretentiously so |
| _____ bulwark | (d) having many different forms or elements |
| _____ curtail | (e) able to be maintained or defended against attack or objection |
| _____ grandiose | (f) existing in something as a permanent, essential, or characteristic attribute |
| _____ Dog star | (g) provide with a quality, ability, or asset |
| _____ manifold | (h) of or relating to the Christian Church or its clergy |
| _____ inherent | (i) use ambiguous language so as to conceal the truth or avoid committing oneself |
| _____ adornment | (j) a thing that adorns or decorates; an ornament |
| _____ assert | (k) a defensive wall |
| _____ endow | (l) the name by which China was known to medieval Europe |
| _____ equivocate | (m) of, producing, or having a pleasant tune; tuneful |
| _____ manifest | (n) having the same center |
| _____ cathay | (o) a learned person, especially a distinguished scientist |
| _____ eminent | (p) famous and respected within a particular sphere or profession |
| _____ consonant | (q) Sirius |
| _____ savant | (r) reduce in extent or quantity; impose a restriction on |
| _____ ecclesiastical | (s) clear or obvious to the eye or mind |
| _____ homocentric | (t) in agreement or harmony with |

Section 2. Multiple choice (10 pts.)

1. The ecliptic
 - (a) is essentially the plane of the solar system
 - (b) is a great circle which intercepts the celestial equator at the first point of Aries and the last point of Virgo
 - (c) is a great circle inclined at an angle of about 24 degrees to the celestial equator.
 - (d) runs through the twelve constellations comprising the zodiac
 - (e) all of the above
2. Which planet has an orbital period (about the sun) of approximately 2 years?
 - (a) Mercury
 - (b) Venus
 - (c) Mars
 - (d) Jupiter
 - (e) Saturn
3. Mars is nearest to earth when it appears to
 - (a) be in the “new” phase
 - (b) rise in the evening
 - (c) set in the evening
 - (d) be smallest
 - (e) actually, Jupiter is always at the same distance from the Earth
4. If a newly discovered planet exhibits about 30 degrees of angular elongation, and it is found to exhibit 5 cycles of anomaly during 3 cycles of elongation. Then its orbit probably lies between
 - (a) mercury and venus
 - (b) venus and earth
 - (c) earth and mars
 - (d) mars and jupiter
 - (e) jupiter and saturn
5. According to Kepler, schools tend to focus on that which is
 - (a) easy
 - (b) true
 - (c) good
 - (d) beautiful
 - (e) challenging
6. How many platonic solids are there?
 - (a) 1
 - (b) 3
 - (c) 5
 - (d) 7
 - (e) 9

7. Two satellites orbit Saturn. The ratio of their orbital distances is 4:1. The ratio of their orbital periods is
- (a) 3:1
 - (b) 8:1
 - (c) 9:1
 - (d) 27:1
 - (e) none of the above
8. When looking through a telescope at a half-moon, you detect two small bright spots a short distance into the dark region. You should conclude that the one that is further into the dark region is
- (a) an alien civilization attempting to communicate with you
 - (b) the shorter of the two mountains
 - (c) the taller of the two mountains
 - (d) the deeper of the two craters
 - (e) a lava pit
9. If a telescope magnifies the observed *diameter* of a planet by 10 times, by how many times will its *volume* be magnified?
- (a) 10
 - (b) 100
 - (c) 1,000
 - (d) 10,000
 - (e) none of the above
10. Jill, on Earth, sees a crescent moon on a particular night. At the same time Jack, who is on the moon, sees a
- (a) new Earth
 - (b) crescent Earth
 - (c) half Earth
 - (d) gibbous Earth
 - (e) full Earth

Section 3. Copernicus' worldview (4 pts.)

1. Clearly and unambiguously label the items listed below.

- (a) the sun
- (b) the earth at the time of the autumnal equinox
- (c) the earth at the time of the winter solstice
- (d) the constellation Virgo

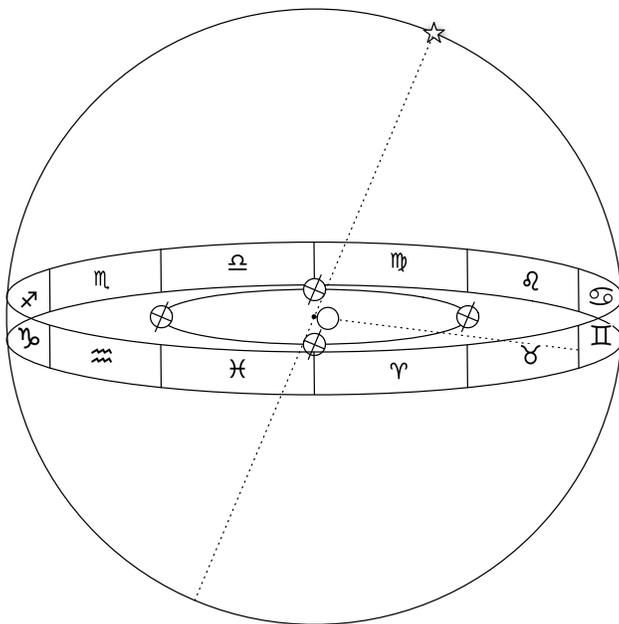


Figure 1: The celestial sphere, based on Copernicus's *Revolutions of the heavenly spheres*

- 2. When looking down toward the earth from Polaris, does the earth spin about its own axis clockwise or counterclockwise?

- 3. In what constellation will the sun be found when it is at apogee (farthest from the Earth)?

Section 4. Short essays

Answer the following essay question in the space below. Be sure to use correct spelling, grammar and punctuation.

1. **Heliocentrism or Geocentrism essay (3 pts.)** Which do you believe: heliocentrism or geocentrism (or neither)? Why? Be sure to provide careful reasons for your opinion. (Simply stating your view without justification will earn you no credit.)

2. **Mind in Nature essay (3 pts.)** In his *Epitome of Copernican Astronomy*, Kepler speculates as to whether *minds* or *intelligences* are required to explain the motion of the planets. What do you think? Is intelligence or mind an appropriate explanation for *planetary* motion? What about for *human* or *animal* motion? Explain your reasoning, and justify your position.