

ASTRONOMY 20 (LLOYD) **STUDY GUIDE EXAM #2** FALL 2019

**Tue. Oct. 15 & Thurs. Oct. 17**

**Notes:** You may use notes written on **one** 3x5 inch file card, written in your own hand.

**Motion of the planets** (Reader 18 & 19)

1. Explain the difference between inferior and which superior planets. Which are the two inferior planets?
2. Discuss how the speed of a planet depends on its distance from the Sun.
3. Compare the direction of motion of the inferior and superior planets along the ecliptic (eastward or westward) at conjunction and opposition.
4. Explain why inferior planets have inferior conjunction and superior conjunction, while superior planets have opposition and conjunction. Be able to illustrate.

**Copernican Revolution** (Astropedia Ch. 3; Reader 25.)

1. Describe the contributions of Copernicus and Galileo to astronomy.
2. Explain three arguments that were used in favor of Copernicus's theory before the invention of the telescope.
3. How is the principle of **Occam's Razor** used?
4. Discuss how the observations that Galileo made using the telescope supported the Sun-centered theory.
5. Discuss how the Copernican Revolution changed the way people looked at the world.
6. What is **stellar parallax**? What was the reason why astronomers could not detect it prior to the invention of the telescope?

**Kepler's Laws** (Astropedia Ch. 3; Reader 26. Lecture-tutorial "Kepler's 2nd Law", "Kepler's 3rd Law")

1. State Kepler's 3 Laws and explain what they say about the shape of a planet's orbit, its speed, and its orbital period.
2. Illustrate the parts of the **ellipse: focus, major axis, semiaxis major (s.a.m.)**.
3. Define the **eccentricity** of an ellipse. Draw ellipses with  $e = 0$  and  $0.999$
4. What is the definition of **astronomical unit (AU)**? How much is it in km?

**Gravity** (Astropedia Ch. 3; Reader 28 including worksheet 28.7 to 28.12)

1. State the **Law of Inertia** and apply it to moons and planets.
2. Discuss the Pisa Principle and the acceleration due to gravity (1 g). How much is it on the Earth's surface? Discuss how it varies on other planets.
3. Explain the difference between **mass** and **weight**.
4. Explain how to put a satellite in orbit. Explain why the Moon doesn't fall to the Earth.
5. Compare the orbital speed for spacecraft in low Earth orbit with the **escape speed**.
6. Explain what we mean by **weightlessness** in orbit and why the astronauts seem weightless.
7. Discuss how the circular speed and the escape speed don't depend on the mass of the *satellite*.
8. Give an example of the **inverse square law**.
9. Define the **Gravitational constant** and explain how it is measured.
10. Describe the 4 kinds of paths an orbiting spacecraft can move on. Show how its speed determines the kind of path.