

ASTRONOMY FINAL

NAME _____ STUDENT NUMBER _____

There are a possible 106 points.

Section I. TRUE/FALSE (1 point each)

- _____ 1. A light year is the amount of time that it takes light to travel one A.U.
- _____ 2. At some point in time, we can see an object at -60° declination here in Auburn (latitude 33°N).
- _____ 3. It is possible for the Moon to be both waxing and gibbous at the same time.
- _____ 4. A superior planet can be at opposition.
- _____ 5. Eratosthenes accurately calculated the size of the Earth.
- _____ 6. One of Newton's laws says that an unbalanced force produces an acceleration that is proportional to the force and inversely proportional to the mass of the object to which the force is applied.
- _____ 7. An approaching light source is redshifted and a receding one is blueshifted.
- _____ 8. Seismic waves can be used to study the interior of the Earth.
- _____ 9. The best theory of lunar formation says that the moon formed elsewhere and was captured by the Earth.
- _____ 10. Mars has large polar caps that are visible from the Earth.
- _____ 11. The same side of Mercury always faces the Sun.
- _____ 12. The surface of Jupiter is covered with large boulders.
- _____ 13. Saturn undergoes differential rotation.
- _____ 14. The leading theory says that the rings of Saturn are the result of the destruction of small satellites by collisions.

- _____ 15. Uranus and Venus have practically the same tilt of rotational axes.
- _____ 16. Neptune has rings.
- _____ 17. The asteroids are probably a disintegrated planet.
- _____ 18. Comets are planet-sized bodies with highly elliptical orbits.
- _____ 19. The Sun shines due to fission reactions.
- _____ 20. Sunspots are relatively cool regions on the Sun's "surface".
- _____ 21. Spectroscopic parallax uses the redshift of a star to determine its distance.
- _____ 22. Main sequence fitting can be used to determine the distance to a cluster.
- _____ 23. The outer layers of the Sun will eventually expand to produce a planetary nebula and leave a white dwarf.
- _____ 24. A pulsar is a rapidly rotating black hole with an accretion disk.
- _____ 25. The Milky Way undergoes differential rotation.
- _____ 26. The 21 cm hydrogen emissions show that hydrogen gas is distributed uniformly throughout the disk of the Milky Way.
- _____ 27. Organic molecules have been detected in dark clouds by their radio emissions.
- _____ 28. The reason that elliptical and spiral galaxies are different in appearance is because of different times of star formation in the evolution of these galaxies.
- _____ 29. In rich star clusters, gravitational interactions force more massive galaxies to the outer portions of the cluster.
- _____ 30. Hubble's constant is directly related (but inversely proportional) to the age of the universe.
- _____ 31. Enough matter has been detected to gravitationally close the universe.
- _____ 32. In the closed universe model, the expansion is exactly balanced by gravitational pull.

Section II. MULTIPLE CHOICE (1 point each)

_____ 1. If the Moon passes between the Sun and the Earth, but the Moon is too far away to completely cover the Sun's image then we have a(n):

- (a) total solar eclipse
- (b) lunar eclipse
- (c) annular eclipse
- (d) aphelion eclipse.

_____ 2. Which of the following is not a property of electromagnetic radiation?

- (a) ionization
- (b) wavelength
- (c) frequency
- (d) velocity

_____ 3. Which of the following is not a product of the Earth's magnetic field?

- (a) magnetosphere
- (b) Van Allen belts
- (c) solar wind
- (d) aurora

_____ 4. Which of the following is not a moon of Saturn?

- (a) Dione
- (b) Triton
- (c) Mimas
- (d) Iapetus

_____ 5. A cloud of ionized interstellar gas that glows is a(n)

- (a) reflection nebula
- (b) H II region
- (c) open cluster
- (d) halo.

_____ 6. The Andromeda Galaxy in the Local Group is at a distance of

- (a) 2000 light years
- (b) 2 million light years
- (c) 2 billion light years
- (d) 20 billion light years.

Section III. FILL IN THE BLANK (2 points each)

1. $\Lambda(n)$ _____ is the amount of time it takes a particular star to travel from its highest point in the sky, back to that point.

2. A contribution of Ptolemy was _____.
3. Kepler's third law can be used to determine the total mass of a cluster of galaxies. It says _____.
4. _____ was the first to seriously use a telescope for astronomy.
5. Radio telescopes can be linked together to produce very large effective diameters using the method of _____.
6. The layers of the Earth's atmosphere are _____, _____, _____, and _____.
7. The three types of rocks are _____, _____, and _____.
8. _____ is responsible for the high temperatures on Venus.
9. _____ on Mars is the largest mountain in the solar system.
10. The two moons of Mars are _____ and _____.
11. Dark _____ on Jupiter are low pressure regions where air is descending.
12. The four Galilean satellites are _____, _____, _____, and _____.
13. The largest moon of Saturn is _____ and it has an atmosphere.
14. Two moons of Uranus are _____ and _____.
15. The largest moon of Neptune, _____, has a thin atmosphere and may have had volcanic activity at one point.
16. Three layers of the Sun's atmosphere are _____, _____, and _____.
17. A binary detected from the presence of two spectral types of stars is a _____.
18. An H-R diagram is a graph of _____ versus _____.

19. _____ are dense spherical collections of stars in the halo of the Galaxy.
20. Three helium nuclei combine to form carbon in the _____.
21. If a star collapses and is too massive to form a white dwarf, then it may form a(n) _____ or a(n) _____.
22. At the center of a black hole, the mass is concentrated to an infinitesimally small region called a _____.
23. Interstellar dust can obscure light from distant stars, a process called _____.
24. _____ stars are old. They occur in the halo and central bulge of the galaxy.
25. _____ are irregular galaxies that orbit the Milky Way.
26. _____ are long, thin warps in the fabric of spacetime. These are theorized to explain the structure of superclusters.
27. In the 1940's, George Gamow predicted the existence of _____ which was found by Penzias and Wilson in the 1960's.
28. _____ are elliptical galaxies with very bright nuclei that resemble quasars.
29. The hardest thing to explain about quasars is _____.

Section IV. DISCUSSION (10 points)

1. In this class we have talked about the beginnings and the endings of the universe. Throughout history, the results of science have had profound impacts on the religious and philosophical beliefs of the day. Tell me what *you* believe about the beginning and the end. Do you believe in God? Do you believe in the Big Bang? Do you believe in evolution? Include a discussion of the relationship that you see between religion and science, if any.