Given (a.k.a. 'First') Name(s): ___________________  Family (a.k.a. 'Last') name: _________________________________

ON YOUR PARSCORE: 'Bubble' your name, your student I.D. number, and your multiple-choice answers. I will keep the Parscore forms.

ON THIS TEST PACKET: Write your name. Circle your multiple-choice answers on this packet, so that you can check them when we go over the test in class. I will hand this packet back to you when we go over the test, and you’ll keep it.

Astronomy 10 Test #1 Practice Version

True/False
Indicate whether the statement is true or false. (3 pts. each)

1. A star with an apparent magnitude of 3.7 looks brighter than a star with an apparent magnitude of 8.9.

2. Isaac Newton realized that if you could get above the Earth’s atmosphere, and move parallel to the ground at a high enough speed, you’d stay in orbit and never come down.

3. The main reason for putting a telescope like the Hubble Space Telescope in space is to avoid the distorting and blurring effects of the Earth’s atmosphere.

4. The Earth’s seasons occur because the Earth is closer to the Sun at certain times of year, and farther from the Sun at other times of year.

5. When an object moves at a large fraction of the speed of light, it gets noticeably shorter, as measured along the direction of motion by an outside observer.

Matching (4 pts. each)

For each question, choose the one item (from a through e) that fits the best. Items from a through e can be used more than once.

For each question, choose the one item (from a through e) that fits the best. Items from a through e can be used more than once.

a. Full Moon  
   b. Synodic period  
   c. Third Quarter Moon  
   d. New Moon  
   e. First Quarter Moon

6. The 29.5-day cycle of lunar phases

7. The Moon is at its highest point in the sky around sunset.

8. The Moon is not visible in the nighttime sky, no matter what time of night you look.
9. The Moon rises around midnight.

10. The Earth is between the Sun and the Moon.

Multiple Choice - General Knowledge
Choose the ONE best answer and mark it on your Parscore form. (5 pts. each)

11. How many times brighter is star X than star Y, if star X is one magnitude brighter than Y?
   a. 100 times brighter
   b. 2.512 times brighter
   c. 10 times brighter
   d. 5.152 times brighter

12. Let's say you're an amateur astronomer who has just gotten into the hobby. Your friends' telescopes have larger apertures than yours, and you're jealous. If you had a telescope with a larger aperture, which of the following would be something your new telescope could do that your old one couldn't?
   a. It could resolve smaller details, such as smaller craters on the Moon's surface, or 'tighter' double stars.
   b. It would gather less light than your old telescope, thus keeping bright objects like the Moon from looking uncomfortably bright.
   c. It would be able to reduce the effects of the Earth's turbulent atmosphere, so that your views of celestial objects would not be blurred by 'poor seeing'.
   d. It would have a lower magnification than your old telescope, so that you wouldn't be so annoyingly 'zoomed-in' on everything.

13. If someone is moving towards you at half the speed of light (i.e. half of 186,000 miles per second), and they shine a light at you, what speed will the light have when it hits you?
   a. 1.5 times normal light speed, i.e. about 280,000 miles per second.
   b. Normal light speed, about 186,000 miles per second.
   c. Twice normal light speed, i.e. about 372,000 miles per second.
   d. One-half normal light speed, i.e. about 93,000 miles per second.
14. The Sun’s gravity is a very important factor in why the Earth orbits the Sun. What, specifically, does the Sun’s gravity do?
   a. It helps to force the Earth away from Mars, thus preventing the Earth from colliding with Mars the way it constantly tries to do.
   b. It isn’t actually the Sun’s gravity that enables the Earth to orbit the Sun, but rather a magnetic pull from the Sun.
   c. It constantly changes the direction of the Earth’s motion, curving the Earth’s path into an ellipse.
   d. The Sun’s gravity exerts a backward pull on the Earth, keeping it from orbiting the Sun even faster than it already does.

15. A friend of yours says ‘there will be a solar eclipse tomorrow, since tomorrow is Full Moon’. Which of the following is the most accurate response?
   a. You’re right, since solar eclipses occur when the Earth is between the Sun and the Moon.
   b. That’s wrong, since solar eclipses can only occur at New Moon.
   c. That’s wrong, since eclipses only occur when the Moon is on the ecliptic.
   d. That’s right, since the Moon will give us plenty of light to see the eclipse tomorrow night.

16. If we took one baby (from a pair of twins) and sent them on a spaceflight at nearly the speed of light, what would they notice when they returned to Earth?
   a. They would have aged normally, just like the twin who stayed on Earth.
   b. They had aged much less than their twin who stayed on Earth.
   c. They would have become much older than the twin who was left behind.
   d. They had become much smaller than the twin who stayed on Earth.

17. Which of these statements regarding our position in the Universe is most accurate?
   a. The Milky Way galaxy is within our solar system.
   b. Our solar system is within the Milky Way galaxy.
   c. The largest structures in the universe are part of the Milky Way galaxy.
   d. The Virgo galaxy cluster is within the Milky Way.

18. When Galileo observed Venus, he saw something that didn’t fit with the Ptolemaic model for the Solar System. What was it?
   a. Venus sometimes shows a nearly full phase, and not just a crescent.
   b. Venus looks brighter at certain times than at others.
   c. Venus shows phases, instead of always looking nearly full at times.
   d. Venus sometimes shows a crescent phase, and not just a constant, nearly-full phase.
19. Besides holding the telescope steady, what important function does a telescope’s mount (or “mounting”) serve?
   a. It compensates for changes in latitude of the telescope throughout the year.
   b. It enables the telescope to track an object across the sky as the Earth rotates.
   c. It keeps the telescope pointed at the celestial pole at all times.
   d. It compensates for the annual apparent motions of the planets relative to the background stars.

**Multiple Choice - Deeper Thought**

*These questions are just like the other multiple-choice questions, just a little harder. As before, choose the ONE best answer and mark it on your Parscore form.*

(7 pts. each)

20. Imagine you’re watching a TV broadcast from the International Space Station, and you see the astronauts ‘floating’ around inside the station. Which of the following is the best explanation of why they seem to be in a ‘zero-gravity’ environment?
   a. Since the astronauts are partway to the Moon, the Moon’s gravitational pull is cancelling out the Earth’s, thus holding them in a perfect balance, which gives the illusion of ‘Zero-G’.
   b. As they orbit around the Earth, the astronauts and the space station are ‘falling’ at the same speed, giving the illusion that there’s no gravity.
   c. Because they’ve been launched far out into space, they are beyond the pull of the Earth’s gravity.
   d. There actually is some gravity from the Earth there, but it has gotten so weak (due to distance from the Earth), that the astronauts can hardly notice it.

21. Which of the following is NOT a reason why astronomical observatories are often built on mountaintops?
   a. By getting above some of the Earth’s atmosphere, it is possible to look at astronomical objects using wavelengths of light that would otherwise be blocked by the atmosphere.
   b. Depending on weather conditions, being on top of the mountain means that you may be above fog or clouds some of the time.
   c. By getting above some of the Earth’s atmosphere, there are fewer problems with atmospheric turbulence causing poor ‘seeing’.
   d. Being on top of a high mountain means that you are somewhat closer to the objects you are studying, particularly objects like the Moon.
22. Imagine that you’re inside a spacecraft, but you have no way of looking outside. The only observations and experiments you can perform are those that you can do inside your spacecraft. Which of the following experiments could answer the question “Is my craft sitting still, or is it moving in a straight line at a constant speed?”
   a. See how fast your clock is ticking, and check to see if it seems to be slowed down.
   b. Sit in the middle of the spacecraft, and see if you feel yourself being pressed towards one wall of the spacecraft.
   c. No experiments inside the spacecraft can answer this question.
   d. Drop a ball from one hand into the other, and see if it seems to be deflected towards the back of the spacecraft.

23. Imagine that it’s thousands of years ago, and a friend tells you that the stars appear to rise and set because the Earth is rotating. Which of these would be your most likely objection?
   a. If it were rotating, the Moon wouldn’t appear to move eastward relative to the Sun.
   b. If it were rotating, the stars wouldn’t appear to rise and set.
   c. If it were rotating, and I jumped up in the air, I’d land far to the west of where I started.
   d. If it were rotating, the Sun wouldn’t appear to move across the sky.

24. [EXTRA CREDIT] The brightest star in the sky (besides the Sun) is the star Sirius. It has an apparent visual magnitude of -1.44. The intensity of its light, as seen here on Earth, is 1,138 times greater than the intensity of light from the dimmest stars that we can see. What is the apparent visual magnitude of one of these dimmest visible stars? (8 pts.)
   a. 6.2
   b. 8.8
   c. 0
   d. -2.3
   e. 1.44
For each slide: Q1 = 3pts, Q2&3 = 6 pts ea., Q4 = 8 pts.

Slide Section

25. (T/F) The telescope on the right is an example of a reflecting telescope.

26. What do the items marked X and Z have in common?
   a. They are both made of aluminum metal.
   b. They are both transparent to light.
   c. They both gather light and focus the rays of light to a point.
   d. They are both light-sensitive silicon chips used for taking images of astronomical objects.

27. What is the purpose of the item marked Y?
   a. It increases the aperture of the telescope.
   b. It increases the magnification of the telescope.
   c. It keeps the observer from having to block the front end of the telescope with their head.
   d. It spreads the light from a celestial object into a spectrum, allowing the astronomer to analyze the composition of the object.
28. The telescope design on the right was originally invented by Isaac Newton, and the version shown here was perfected by a designer named Guillaume Cassegrain. When Newton first invented this type of telescope, what problem (that the `scope on the left would have) was he trying to avoid?
   a. The glass in item X isn’t very transparent, so objects seen through the telescope on the left look very dim.
   b. Different colors of light coming to focus at different distances, causing colored `halos’ around objects as seen through the eyepiece.
   c. It was extremely difficult to make a curved reflective surface, so he was trying to find a way to use lenses instead of mirrors.
   d. The focal length of a telescope like the one on the right can be made much longer than the one on the left.

29. (T/F) This diagram shows a conceptual `model’ of part of the Solar System. The model shown here is part of the Copernican, or heliocentric view of the solar system.

30. In the model of the solar system shown here, what purpose is served by having the center of Venus’s epicycle `attached’ to a line joining the Earth and the Sun?
   a. It explains why Venus always seems to be on the opposite side of the Sun from the Earth.
   b. It explains why Venus only shows crescent phases when observed through a telescope.
   c. It explains why Venus never appears very far from the Sun in the sky.
   d. It keeps Venus from colliding with the Earth.
31. What explains the partially-lit-up appearance of Venus in this picture?
   a. As Venus orbits the Sun, it moves through the thin gas of interplanetary space, and the frictional heating of its front side makes that side glow.
   b. The Earth is casting a shadow on Venus, just like it does when making the phases of the Moon.
   c. From the Earth’s point of view, we’re mostly looking at the dark side of Venus.
   d. No matter where Venus is on its epicycle, the dark side of Venus is too far away from us to be seen clearly, and that’s why it looks dark.

32. Imagine that you could change the model shown in this picture. Imagine moving Venus’s epicycle so that it’s centered on the Sun, and changing the word ‘epicycle’ to ‘orbit’. If you examined Venus through a telescope over a period of time, what would you notice about the appearance of Venus?
   a. It would never be visible from the Earth, because it would always be lost in the blinding glare of the Sun.
   b. Its phases would look basically the same as in this drawing - nothing much would change.
   c. It would go through a full cycle of phases like the Moon, and not just show crescent phases like in this picture.
   d. Since this would put Venus much farther from the Sun, we wouldn’t be able to see it, since the Sun’s light on it would be much too faint.
33. (T/F) This photograph was made by taking several exposures of the Moon over a period of time. It illustrates the Moon’s cycle of phases, from Full to New and back to Full again.

34. In this image, we see the shadow of a solar-system object being cast onto the Moon. This is the shadow of which body?
   a. The Sun
   b. The Moon’s shadow, reflected off of the Earth
   c. The Earth
   d. Mars

35. In this image, notice the shape of the shadow’s edge. What did ancient astronomers deduce from this shape?
   a. The Earth is spherical.
   b. The Sun is closer to the Earth than the Moon is.
   c. The Moon is spherical.
   d. The Earth is at the center of the solar system.
36. Billions of years ago, shortly after the Earth and Moon formed, the Moon was significantly closer to the Earth than it is now. If a sequence of images like this were taken back then, how would it look different?
   a. The shadow would look smaller, compared to the Moon.
   b. The shadow would be shaped like an ellipse.
   c. The shadow would look bigger, compared to the Moon.
   d. It would be impossible for a shadow like this to be visible on the Moon.

37. (T/F) This diagram shows a geocentric model of the solar system.

38. In this diagram, what does the line with two arrowheads represent? (5 pts.)
   a. The direction from the Earth to the center of the Milky Way galaxy
   b. The size of the Sun’s epicycle as it revolves around the Earth
   c. A light-year
   d. One astronomical unit

39. In this diagram, notice that the Sun is not quite at the center of Mercury’s orbit. Why is this? (5 pts.)
   a. The gravity of the other planets pulls Mercury away from its normal orbit.
   b. Mercury’s orbit is actually an ellipse, with the Sun at one of the two focus points.
   c. The gravity from the center of the Milky Way pulls the Sun away from the center of Mercury’s orbit.
   d. The center of Mercury’s orbit revolves around the Sun on an epicycle.
40. Here are the semi-major axes of the orbits of Mercury, Earth, Jupiter, and Neptune, in astronomical units: 0.387, 1.000, 5.203, and 30.07. Which planet will take the longest to orbit the Sun?
   a. Jupiter
   b. Neptune
   c. Mercury
   d. Earth
Astronomy 10

Answer key for Test #1 PRACTICE VERSION

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1 | T |   | 21 | D |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2 | T |   | 22 | C |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3 | T |   | 23 | C |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 4 | F |   | 24 | A |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 5 | T |   | 25 | T |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 6 | B |   | 26 | C |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 7 | E |   | 27 | C |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 8 | D |   | 28 | B |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 9 | C |   | 29 | F |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|10 | A |   | 30 | C |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|11 | B |   | 31 | C |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|12 | A |   | 32 | C |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|13 | B |   | 33 | F |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|14 | C |   | 34 | C |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|15 | B |   | 35 | A |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|16 | B |   | 36 | C |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|17 | B |   | 37 | F |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|18 | A |   | 38 | D |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|19 | B |   | 39 | B |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|20 | B |   | 40 | B |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |