Instructions: This test has the same format as before. Part A consists of short answer questions where you are to pick the best work, phrase, or choice of answers which best answers or, in some cases, defines the statement. Part B consists of longer answer questions. Make your answers clear and concise. If you need more room turn over the test paper and continue on the back but please indicate on front. For problems it is the procedure that will be checked, not only the answer, so please try to make it clear. So for this, the third poets’ test of the term, Good Luck!

Declaration: I elect to do a (term paper, lab project). Please circle. The title is ________________________ and it (has, has not) been approved.

A. Short Answer Questions (1 point each question except where noted).

1. A stone is dropped into initially smooth water. The wave that results is (a) elliptical (b) cubic (c) transverse (d) longitudinal (Choose one.)

2. The distance that light travels in one year is an astronomical distance unit called ___.

3. The sun passes across the sky in the plane of the ecliptic. (true, false)

4. Why is it that all the constellations appear to move around in a circle as night progresses?

5. Which planet is known for its "great red spot."

6. (1 ½) List three planets that have 10 or more moons?

7. (1 ½) REVIEW QUESTION: A person weighing 100 lb here on earth goes to planet X having a radius two times that of the earth and a mass six times as large. The person will weigh ___ on the surface of that planet.

8. (2) The planets which are known to have substantial amounts of hydrogen and helium in their atmosphere are?

9. The present atmosphere of the earth consists of about 21% ___ and about 78% ___.

10. The galaxy of which our solar system is a part is called ___.

11. (1 ½) An "equinox" is ____________________________.

12. (1 ½) Draw, as best you can, the position of the earth (and its axis) and sun when the winter "solstice" occurs ____________________________.

13. (1 ½) From the periodic chart list three symbols of elements which have only two electrons in their outer shell.

14. The number of protons in the nucleus of an atom is called the ___

15. (1 ½) Two atoms which have the same number of protons in the nucleus but a different number of neutrons are called ___. Two examples would be ___ ___ and ___.


16. (3) For Carbon 14, the number of protons in the nucleus is ?, the number of neutrons in the nucleus is ?, the total number of electrons in a neutral carbon atom is ?. Of this total number of electrons, ___, ___ are in the first shell and ___ are in the second shell.

17. What is the significance of the "wobbling" of a star?

18. (1 ½) The molecule C₉H₁₆O₄ consists of ___ carbon atoms, ___ hydrogen atoms, and ___ oxygen atoms.

19. A physical quantity designating the number of waves given off by a vibrating object every second is called ___, and is in units of ___.

20. A physical quantity designating the time that it take for one complete cycle or oscillation to occur is called ___.

21. In a time of one period, a wave travels a distance of one ___.

22. The mass of an object per unit volume is a description of a physical quantity called ___.

23. One divided by the "period" gives another physical quantity called ___.

24. The speed of a sound wave is a measure of the speed of a typical molecule of air that results when a person speaks. (true, false)

25. At a rarefaction (or expansion), the density of air (as well as the air pressure) is ___ what it would normally be. Choose from (a) higher than; (b) lower than; (c) the same as.

26. (1 ½) Four half-wavelengths just fit in between two fixed supports for a vibrating string. The string is vibrating in its ___ harmonic and its ___ overtone.

27. If the fundamental frequency of an open-ended pipe is 256 Hz, the frequency of the 4th harmonic is ___, and the frequency of the 5th overtone is ___.

28. (1 ½) List three examples of resonance.

29. (1 ½) If the distance from a condensation of a sound wave to the next successive rarefaction is 2.4 meters, what is the wavelength of the wave?

30. (1 ½) If the distance from a condensation of a sound wave to the next successive condensation is 2.4 meters, what is the wavelength of the wave?

31. A pulse travels the length of a 5 m long slinky in 10 s. The speed of the pulse is ___.

32. If the fundamental frequency of a closed-ended organ pipe is 256 HZ, the frequency of its third overtone is ___.

33. (1 ½) REVIEW QUESTION: The reaction force to the weight force—i.e., the force exerted by the earth on our body—is given to us from Newton’s ___ Law and is equal to the force that is exerted by ___ on ___. 
B. Longer Answer Questions

1. (3) It is one thing for "Carbon-Water-Oxygen" life to exist on another planet. List two additional requirements discussed in class that is necessary for us to communicate with another life form?

2. (3) If you take a water drop 1/4" in diameter and magnify it, explain what you would see if you magnified it by (a) x2000 (b) x2000 (again) and then (c) by 250 times.

3. (4) REVIEW QUESTION: What cause ocean tides? Why are there two high tides (and also two low tides) per day?

4. (6) List 6 characteristics necessary for a carbon-oxygen-water type of life according to Dr. Bracewell of Stanford University.
5. (5) Why are electron shells important in determining how molecules are formed from atoms? Give an example of a molecule formed from atoms by discussing the number of electrons of each in the outer shell.

6. (4) Explain what is meant by the term “escape velocity.” Use this concept to explain why it is that the moon has no atmosphere, why the earth has its corresponding atmosphere of heavier gases but not hydrogen or helium, and why the atmosphere of Jupiter retains hydrogen and helium.

7. (4) Define and distinguish between a longitudinal wave and a transverse wave and give two examples of each.

8. (2) What happens when a transverse wave bounces off a fixed support? Refer to our slinky demonstration Tuesday.
9 (3) REVIEW QUESTION: What is Newton’s Second Law? Make up an example of its use.

10. Define or briefly describe the following terms:
   (2) atomic mass (or atomic “weight”)
   (2) REVIEW QUESTION: centrifugal force
   (2) alpha centauri
   (2) resonance
   (2) atomic number
   (2) black hole
   (2) wave train
   (2) escape velocity
10. (8) Please answer the following questions in this part by choosing your answer from the following list of possible choices: (½ point each blank.) Some Choices can be used more than once!

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<th>Acropol</th>
<th>Helium</th>
<th>Mercury</th>
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<td>Neptune</td>
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<td>Inclination of Axes</td>
<td>Nitrogen</td>
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<td>Oblateness</td>
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<td>Mars</td>
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<td>Equatorial diameter</td>
<td>Methane</td>
<td>Oxygen</td>
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a) The term which can be used to best explain why we have night and day. 

b) The planet whose rings can be seen through telescopes here on earth. 

c) A measure of how "pancake-like" a planet (or object) is? 

d) Two planets which turn on their axes backward ("retrograde") from every other planet known in our solar system. 

e) The planet having the greatest orbital velocity is? 

f) A planet whose moons were observed by Galileo. 

g) The planet with the hottest surface is? 

h) The term designating the time to make one complete cycle around the sun. 

i) The term designating the time a heavenly body takes to make one complete turn on its own axis. 

j) A term designating the plane of the earth's orbit. 

k) All other planets lie very nearly in the plane of the earth's orbit except for one. What planet is it? 

l) The planet with the least mass is? 

m) The most dense planet is? 

n) The planet having the largest surface gravity is? 

o) One of two planets which have mostly carbon dioxide in their atmosphere is?