

Now Pay Attention – You Can Do This (150,000 points) Multiple-Guess-Fill-In-The-Bubbles

- 1.) Constellations are regions in the sky centered on
 a) groups of galaxies seen clustered in the sky.
 b) groups of stars all orbiting each other.
 c) groups of stars making an apparent pattern in the sky.
 D – groups of stars that are physically close to one another.
 E – None of the above
- 2.) The average distance from the Earth to the Sun is
 a) 1 light-year.
 b) 1 million km.
 c) 1 million miles.
 D - 1 astronomical unit (AU).
 E – None of the above
- 3.) According to the scientific method, a hypothesis that is proposed to explain a particular physical phenomenon is considered in need of revision or rejection if
 A -a leading scientist thinks it is incorrect.
 B - it disagrees with accepted theory.
 C - it disagrees with the results of reliable and repeatable measurements.
 D – it predicts an odd, new phenomenon
 E – None of the above
- 4.) A spaceship is traveling in space far away from stars or planets. While its main rocket engine is turned on it _____, and when its rocket engine is turned off it _____.
 A -accelerates; moves with constant velocity
 B - accelerates; slows toward a stop
 C - moves with constant velocity; slows toward a stop
 D – moves with constant velocity; accelerates
 E – None of the above
- 5.) You are looking at two stars. *Canopus* has an apparent magnitude of -0.72 and *Polaris* (the North Star) has one of $+2.07$. Which has the greater observed intensity of light?
 A -Canopus
 B - Polaris
 C - There is not enough information given to determine this.
 D – They appear with equal brightness.
 E – None of the above
- 6.) The shape that best describes the orbits of the planets around the Sun is
 a) a parabola.
 b) an ellipse.
 c) a perfect circle.
 D – a hyperbola.
 E – None of the above
- 7.) Ignoring the presence of the other planets and moons, if the Sun's mass were to suddenly plummet to zero,
 a) Earth would move in a straight line at constant speed.
 b) Earth would spiral away from the Sun.
 c) Earth would accelerate directly away from the Sun.
 d) Earth would accelerate directly toward the Sun.
 E – None of the above
- 8.) If a star is measured to be 5,000 light years away, then the
 a) star is 5,000 astronomical units away.
 b) star must have formed 5,000 years ago.
 c) star must be intrinsically dim.
 D – light we see left the star 5,000 years ago.
 E – None of the above
- 9.) The cornerstones of the scientific process are
 a) creative thought, theory, & mathematical analysis.
 b) observation/experiment, theory, & testing.
 c) revelation, philosophy, & hypothesis.
 D – observation, revelation, & careful thought.
 E – None of the above
- 10.) Which of the following statements concerning Earth's orbital period would be true, if Earth orbited a star with *half* the mass of our Sun at an average distance of 1 AU?
 a) Its period would be shorter.
 b) A planet's period is unrelated to the mass of the star it orbits.
 c) Its period would be the same.
 D – Its period would be longer.

- E – None of the above
- 11.) If the Earth's average distance from the Sun were 2 AU, then the gravitational force between the Earth and Sun would be _____ its present value.
 A -one-quarter
 B - four times
 C - one-half
 D – twice
 E – None of the above
- 12.) The period of Earth's orbit around the Sun is _____.
 A -1 week
 B - 1 day
 C - 1 year
 D – 1 month
 E – None of the above
- 13.) In early July Earth's distance from the Sun reaches its maximum value, therefore the Earth's orbital gravitational acceleration is
 a) smallest, so the orbital speed is greatest.
 b) greatest, so the orbital speed is greatest.
 c) smallest, so the orbital speed is lowest.
 D – greatest, so the orbital speed is lowest.
 E – None of the above
- 14.) The fictitious planet Kharg orbits its star at an average distance of 3.5 astronomical units. The star's mass is the same as the Sun's. The orbital period of Kharg
 a) cannot be determined.
 b) is longer than Earth's year.
 c) is shorter than Earth's year.
 D – is the same as Earth's year.
 E – None of the above
- 15.) At a distance of 100 light years, a star cluster spans an angle of about 2 degrees in the sky. How far away is another star cluster of equal physical size if it spans an angle of 1 degree?
 A -25 light years
 B - 50 light years
 C - 200 light years
 D – 400 light years
 E – None of the above
- 16.) Suppose that the Sun were to suddenly shrink in size, but that its mass remained the same. What would happen?
 A -The Sun's angular size in our sky would stay the same.
 B - The Sun's rate of rotation would increase.
 C - The Sun's angular size in our sky would increase.
 D – The Sun's rate of rotation would decrease.
 E – None of the above
- 17.) The fictitious planet Zhorg orbits its star in a nearly circular orbit at an average distance of 1.0 astronomical unit. The star's mass is twice that of our Sun's. The average orbital speed of Zhorg
 a) cannot be determined.
 b) is the same as Earth's average orbital speed.
 c) is faster than Earth's average orbital speed.
 D – is slower than Earth's average orbital speed.
 E – None of the above
- 18.) Which of the following is true about the way astronomers gather most of their data today at the telescope?
 A -they place their eyes up to an eyepiece and sketch the images they see on paper
 B - they detect and record the light on photographic film
 C - astronomers do not gather data
 D – they detect the light with electronic detectors
 E – None of the above
- 19.) Ignoring the presence of the other planets and moons, if Earth's orbital motion were suddenly stopped, then
 A -Earth would move in a straight line at constant speed.
 B - Earth would spiral away from the Sun.
 C - Earth would accelerate directly toward the Sun.
 D – Earth would accelerate directly away from the Sun.
 E – None of the above
- 20.) Knowing the period and average orbital distance of a man-made satellite orbiting the Moon, we can compute the
 A -period of the Moon's orbit around the Earth.
 B - mass of the Moon.

- C - mass of the Earth.
 D – period of the Earth's orbit around the Sun.
 E – None of the above
- 21.) The fictitious planet Xorba orbits its star in a nearly circular orbit at an average distance of 5.2 astronomical units. The star's mass is equal to that of our Sun's. The average orbital speed of Xorba
 A - is the same as Earth's average orbital speed.
 B - is slower than Earth's average orbital speed.
 C - is faster than Earth's average orbital speed.
 D – cannot be determined.
 E – None of the above
- 22.) Why must we put X-ray and ultraviolet telescopes in orbit around Earth to observe these forms of light?
 A -too much background noise on the Earth's surface caused by UV-tanning salons and medical X-ray machines
 B - to study these wavelengths of light that do not penetrate the Earth's atmosphere
 C - to get closer to the objects astronomers observe
 D – these photons are too dangerous to study on Earth's surface
 E – None of the above
- 23.) The following distances are equivalent. The way in which astronomers usually state the distance to the nearest star (other than our Sun) is _____.
 A -39.9 trillion km
 B - 267,000 AU
 C - 4.22 light years
 D – 24.8 trillion miles
 E – None of the above
- 24.) Suppose the Sun shrank in size, but that its mass remained the same. What would happen to the orbit of the Earth?
 A -Earth would move into a smaller orbit.
 B - Earth's orbit would be unaffected.
 C - Earth's motion would cause it to escape the Sun.
 D – Earth would move into a larger orbit.
 E – None of the above
- 25.) The fictitious planet of *Dantooine* orbits its star with a period of 1 year at an average distance of 2

- AU. How does the mass of this star compare to our Sun's?
 A -We cannot measure the mass of a star; it's too big.
 B - Its mass is about $1/8^{\text{th}}$ that of our Sun's.
 C - Its mass is about the same as our Sun's.
 D – Its mass is about 8 times that of our Sun's.
 E – None of the above
- 26.) A net force of 100 Newtons is applied to ball **A**, of mass 1 kg. In the same way, a net force of 1000 Newtons is applied to a second ball **B**, of mass 100 kg. Compare the resulting accelerations.
 A -Ball **A** undergoes the greater acceleration.
 B - Neither ball would accelerate.
 C - Ball **B** undergoes the greater acceleration.
 D – The balls undergo equal accelerations.
 E – None of the above
- 27.) The force of gravity between the Sun and Jupiter is *much stronger* ($11.7\times$) than the force between the Sun and Earth. Given that Jupiter is $318\times$ more massive than Earth, what can be deduced about Jupiter's orbital acceleration?
 A -Jupiter's orbital acceleration is the same as Earth's.
 B - Nothing; more information is required.
 C - Jupiter's orbital acceleration is $27\times$ greater than Earth's.
 D – Jupiter's orbital acceleration is $27\times$ smaller than Earth's.
 E – None of the above
- 28.) Knowing that the Earth makes its closest approach to the Sun in early January, how does Earth's orbital potential and kinetic energies compare at this time?
 A -potential energy least, kinetic energy least
 B - potential energy greatest, kinetic energy greatest
 C - potential energy least, kinetic energy greatest
 D – potential energy greatest, kinetic energy least
 E – None of the above
- 29.) Only one of the statements below uses the term *theory* in its correct, scientific sense. Which one?
 A -This theory states that the formation of snowflakes is too complex to explain.

- B - Einstein's theory of relativity has been tested and verified thousands of times.
 C - I have a new theory about the cause of earthquakes, and I plan to start testing it soon.
 D – Biological evolution is only a theory, so there's no reason to think it explains the behavior of life.
 E – None of the above