

- 1 Galileo was arrested for arguing that
 - a. Ptolemy's System of Planetary Motion was right.
 - b. Ptolemy's System of Planetary Motion was wrong.
 - c. Aristotle's Laws of Motion were right.
 - d. Aristotle's Laws of Motion were wrong.

- 2 The red line of a spectrum is normally at a wavelength of 656 nm. In the light of a star that is moving away from us, we might expect to see that red line at a wavelength of
 - a. 656nm.
 - b. 650nm.
 - c. 660nm.

- 3 Galileo is generally acknowledged to be the first to
 - a. observe the heavens with a telescope.
 - b. observe distant objects with a telescope.
 - c. design a telescope.
 - d. build a telescope.

- 4 The sun sets in the
 - a. North.
 - b. Ocean.
 - c. South.
 - d. East.
 - e. West.

- 5 Which of the following tasks would *require* a non-science discipline?
 - a. Designing an airplane.
 - b. Finding a cure for cancer.
 - c. Sentencing a criminal.
 - d. Programming a computer.
 - e. Repairing a motorcycle.

- 6 In addition to being accurate, Tycho Brahe's observations focused on measuring the positions of the planets
 - a. during conjunctions.
 - b. when they were in retrograde motion.
 - c. near the horizon.
 - d. all the time.
 - e. during the solstices.

- 7 Ancient astronomers were puzzled by the planets because they
 - a. look like stars.
 - b. execute retrograde loops.
 - c. rotate on their axes.
 - d. rise and set.
 - e. show peculiar colors.

- 8 A biologist argues that the Theory of Evolution has been proven by science. Popper's definition of a scientific statement suggests that this statement
- might be wrong.
 - is right.
 - is undecidable.
 - might be right.
 - is wrong.
- 9 You see a reflecting telescope with a short, stubby tube and the eyepiece at the back. This telescope uses the
- Coudé Focus
 - Prime Focus.
 - Cassegrain Focus.
 - Newtonian Focus.
- 10 A mirror that is shaped like a shallow bowl sitting on the table with its open end facing up will focus light that comes
- vertically down from above.
 - vertically upward from below.
 - horizontally from the side.
- 11 A unit of force is the
- meter.
 - meter per second.
 - kilogram.
 - meter per second per second.
 - Newton.
- 12 The path of the Sun on the Celestial Sphere is called
- The Ecliptic.
 - The Solar Trajectory.
 - The Great Circle.
 - The Celestial Equator.
 - The Equinox.
- 13 Suppose that a flash of lightning from a cloud 2500 meters away is followed by a clap of thunder two seconds later. Assume that the light arrived in a negligible time and calculate the speed of the sound waves.
- 5000m/s
 - 2m/s
 - 1250m/s
 - 2500m/s
 - 1000m/s
- 14 Light with an absorption spectrum is usually generated by
- a hot, rarefied gas.
 - hot, dense material.
 - light from hot dense material passing through a rarefied gas.
 - a cold, rarefied gas.

- 15 Aristotle said that a moving object with nothing pushing or pulling on it will always
- keep moving at the same speed.
 - follow a circular path.
 - speed up.
 - slow down and stop.
- 16 You see the Moon almost directly in the south at 10pm. What phase is it?
- Full.
 - Waxing gibbous.
 - Waxing crescent.
 - New.
 - Waxing quarter.
- 17 In comparison to Kepler's Laws of Planetary Motion, Newton's theory of Universal Gravitation predicted
- the same motions interpreted differently.
 - exactly the same motions.
 - a completely different set of motions.
 - almost the same motions but with corrections.
- 18 Suppose that only the force of gravity and the force that you, personally, exert are acting on an object with a mass of one kilogram. How much upward force must *you* exert on the object to cause it to accelerate upward at 3 meters per second per second?
- 1 Newton.
 - 12.8 Newtons.
 - 9.8 Newtons.
 - 6.8 Newtons.
 - 3 Newtons.
- 19 The frequencies absorbed by a cold gas are
- exactly double those it emits when hot.
 - always the same as those it emits when hot.
 - unrelated to those it emits when hot.
- 20 In comparison to the established, earth-centered theory, the Copernican Theory of planetary motion made predictions that were of
- much higher accuracy.
 - much less accuracy.
 - about the same accuracy.
- 21 Mercury is closer to the Sun than Earth. Which of the following statements is true?
- Mercury takes less time to go around the Sun but moves slower than the Earth because it does not have as far to go.
 - Mercury takes more time to go around the Sun and moves slower than the Earth.
 - Mercury takes more time to go around the Sun but moves faster than the Earth because it keeps getting confused.
 - Mercury takes less time to go around the Sun and moves faster than the Earth.

- 22 When the Moon crosses the ecliptic,
- we always have an eclipse.
 - we can never have an eclipse.
 - we always get spring or autumn.
 - we can never get spring or autumn.
 - we might have an eclipse.
- 23 Which of Kepler's Laws governs how a particular planet speeds up and slows down?
- The Period-Radius Relation.
 - The Law of Inertia.
 - The Law of Averages.
 - Orbits are Ellipses.
 - The Equal Area Law.
- 24 An automobile with a mass of 2000kg is moving at 20m/s when it goes off the road and hits the safety rail, stopping in just one second. How much force did the safety rail exert on the car in order to stop it?
- 2020N
 - 100N
 - 40,000N
 - 20N
 - 2000N
- 25 The most severe problem facing a radio telescope is
- spherical aberration.
 - chromatic aberration.
 - the diffraction limit.
 - atmospheric absorption.
 - atmospheric turbulence.
- 26 Which of the following light sources would you expect to give polarized light?
- The glowing phosphor coating in a fluorescent lamp.
 - Electric charges moving at random.
 - Electric charges forced to move along magnetic field lines.
 - The hot filament of a light bulb.
- 27 X-Ray observatories are located
- on high mountains to get above most of the atmosphere.
 - in deep mine shafts to filter out cosmic rays.
 - only in space since X-Rays are stopped by air.
 - anywhere on earth since X-Rays are so penetrating.
- 28 Compared to stars of other colors, a blue star will have a surface temperature that is
- in the middle of the range.
 - among the lowest.
 - among the highest.

- 29 Electrons that are bound to the nucleus of an atom (so that energy is needed to remove them) can have
- any negative energy at all.
 - only certain isolated negative energies.
 - any positive energy at all.
 - only certain isolated positive energies.
- 30 The electric charge on an electron is
- negative.
 - positive.
 - zero.
- 31 Newton's explanation of Kepler's Laws relied upon a force that
- acts only on planets.
 - acts only on inorganic matter.
 - acts on all objects.
 - acts only on heavenly bodies.
 - acts on planets but not on comets.
- 32 A problem that is peculiar to infrared telescopes is a need for
- very long exposure times.
 - large reflector sizes.
 - cooling to low temperature.
 - grazing incidence mirrors.
- 33 The wavelength of the sound waves that correspond to middle-C is about 4 feet. If you are standing 8 feet away from a piano that is playing that note, then between you and the piano there will usually be
- one region of maximum pressure.
 - two regions of maximum pressure.
 - maximum pressure every four seconds.
 - three regions of maximum pressure.
 - maximum pressure every two seconds.
- 34 The one-wave turning angle of a telescope mirror determines its
- chromatic aberration.
 - atmospheric limit on its resolution.
 - diffraction limit on its resolution.
 - light collection ability.
 - spherical aberration.
- 35 The fact that Jupiter has satellites going around it indicates that
- The Moon could not be going around the Earth.
 - The Earth could not be moving.
 - Jupiter could not be moving.
 - The Earth could be moving and not lose its own Moon.

- 36 Orbiting ultraviolet observatories are most likely to end their useful life when
- they run out of coolant.
 - funds to operate them run out.
 - their orbits decay.
 - they run out of electric power.
- 37 One reason that the Copernican System failed to fit Tycho's observations was
- it used elliptical orbits instead of circles.
 - it placed the Earth at the center of the universe.
 - it used circular orbits instead of ellipses.
 - it placed the Sun at the center of the system.
- 38 A converging lens will send the light from a distant star through a point
- at one edge of the lens.
 - on the side of the lens opposite the star.
 - in the center of the lens.
 - infinitely far away from the lens.
 - on the same side of the lens as the star.
- 39 The frequency of a wave is defined to be
- The distance from a maximum to a minimum.
 - The time for a set of crests to pass divided by the number of crests.
 - The distance from one crest to the next.
 - The number of crests that pass in one second.
 - The number of seconds that it takes for a crest to pass.
- 40 When viewed looking down from above the Earth's South Pole, the Earth
- does not rotate.
 - always rotates clockwise.
 - rotates clockwise in the spring and counterclockwise in the fall.
 - rotates clockwise in the fall and counterclockwise in the spring.
 - always rotates counterclockwise.
- 41 The force of gravity explains
- how objects fall on Earth but not how planets move.
 - how planets move but not how objects fall on Earth.
 - how the Sun shines but not how planets move.
 - how objects fall on Earth but not how the tides work.
 - how the tides work but not how lightning works.
- 42 Which of the following can be seen everywhere on the night side of the Earth?
- A total eclipse of the Sun.
 - A New Moon.
 - A total eclipse of the Moon.
 - A partial eclipse of the Sun.
 - A waxing quarter Moon.

- 43 Kepler was an early advocate of the Copernican Theory. When he applied it to Tycho's observations, it
- was as accurate as the observations.
 - failed and was completely discarded.
 - worked perfectly.
 - failed but led to a better theory.
- 44 Which of the following can only be seen along a path that is less than 100 miles across?
- A partial eclipse of the Sun.
 - The Sun.
 - A total eclipse of the Sun.
 - The New Moon.
 - The Full Moon.
- 45 When an arrow is fired from a bow, the arrow keeps moving after it leaves the bow because
- it is pointed at the front and has fins at the back.
 - no force stops it.
 - the displaced air pushes it from behind.
 - the force of the bow keeps acting on it.
 - the force of its inertia pushes it.
- 46 Which of the following statements is scientific (as defined by Popper)?
- There are green fish in Lake Nyak.
 - There are no green fish in Lake Nyak.
 - All of the fish in Lake Nyak are ugly.
- 47 We can use the pointer stars in Orion to locate a point in the sky near the
- Star Sirius.
 - South Celestial Pole.
 - East Celestial Pole.
 - Celestial Equator.
 - North Celestial Pole.
- 48 As seen from North America, the constellation Casseopeia
- sets in the north.
 - sets in the south.
 - sets in the west.
 - never sets.
 - sets in the east.
- 49 Which of the following types of radiation has the lowest frequency on this list.
- red light.
 - green light.
 - infrared light.
 - heat radiation.
 - X-Rays

- 50 If the frequency of electromagnetic radiation goes from 3×10^{14} Hz to 6×10^{14} Hz, the energy of each individual photon in the radiation
- is divided by 3.
 - is divided by 2.
 - is multiplied by 2.
 - is multiplied by 3.
 - does not change.
- 51 Once its rockets have ceased firing, an Intercontinental Ballistic Missile will follow a path that is best described as
- a circle around the center of the Earth.
 - a circle around a point just below the surface of the Earth.
 - an ellipse with the center of the Earth at one focus.
 - a parabola.
 - a straight line.
- 52 Copernicus said that the retrograde motion of the planets was caused by the
- planets speeding up and slowing down.
 - earth and the planets orbiting the Sun.
 - planets moving on epicycles.
 - earth turning on its axis.
 - planets turning on their axes.

Answers: Exam 1, Preview 1, Fall 2004

- 1 Choice b. (Ptolemy's System of Planetary Motion was wrong.)
- 2 Choice c. (660nm.)
- 3 Choice a. (observe the heavens with a telescope.)
- 4 Choice e. (West.)
- 5 Choice c. (Sentencing a criminal.)
- 6 Choice d. (all the time.)
- 7 Choice b. (execute retrograde loops.)
- 8 Choice e. (is wrong.)
- 9 Choice c. (Cassegrain Focus.)
- 10 Choice a. (vertically down from above.)
- 11 Choice e. (Newton.)
- 12 Choice a. (The Ecliptic.)
- 13 Choice c. (1250m/s)
- 14 Choice c. (light from hot dense material passing through a rarefied gas.)
- 15 Choice d. (slow down and stop.)
- 16 Choice b. (Waxing gibbous.)
- 17 Choice d. (almost the same motions but with corrections.)
- 18 Choice b. (12.8 Newtons.)
- 19 Choice b. (always the same as those it emits when hot.)
- 20 Choice c. (about the same accuracy.)
- 21 Choice d. (Mercury takes less time to go around the Sun and moves faster than the Earth.)
- 22 Choice e. (we might have an eclipse.)
- 23 Choice e. (The Equal Area Law.)
- 24 Choice c. (40,000N)
- 25 Choice c. (the diffraction limit.)
- 26 Choice c. (Electric charges forced to move along magnetic field lines.)
- 27 Choice c. (only in space since X-Rays are stopped by air.)
- 28 Choice c. (among the highest.)
- 29 Choice b. (only certain isolated negative energies.)
- 30 Choice a. (negative.)
- 31 Choice c. (acts on all objects.)
- 32 Choice c. (cooling to low temperature.)
- 33 Choice b. (two regions of maximum pressure.)
- 34 Choice c. (diffraction limit on its resolution.)
- 35 Choice d. (The Earth could be moving and not lose its own Moon.)
- 36 Choice b. (funds to operate them run out.)

- 37 Choice c. (it used circular orbits instead of ellipses.)
- 38 Choice b. (on the side of the lens opposite the star.)
- 39 Choice d. (The number of crests that pass in one second.)
- 40 Choice b. (always rotates clockwise.)
- 41 Choice e. (how the tides work but not how lightning works.)
- 42 Choice c. (A total eclipse of the Moon.)
- 43 Choice d. (failed but led to a better theory.)
- 44 Choice c. (A total eclipse of the Sun.)
- 45 Choice b. (no force stops it.)
- 46 Choice b. (There are no green fish in Lake Nyak.)
- 47 Choice a. (Star Sirius.)
- 48 Choice d. (never sets.)
- 49 Choice d. (heat radiation.)
- 50 Choice c. (is multiplied by 2.)
- 51 Choice c. (an ellipse with the center of the Earth at one focus.)
- 52 Choice b. (earth and the planets orbiting the Sun.)

Where to find these questions in the notes

- 1 Module 005 The Science Writer: Question 005.42
- 2 Module 010 The Doppler Effect: Question 010.43
- 3 Module 005 The First Astrophysicist: Question 005.21
- 4 Module 001 Apparent Motion of the Sun: Question 001.42
- 5 Module 003 Non-science: Question 003.32
- 6 Module 004 Tycho Brahe's Role: Question 004.43
- 7 Module 004 Wandering Planets: Question 004.11
- 8 Module 003 Scientific Proof: Question 003.12
- 9 Module 012 Telescope Designs: Question 012.32
- 10 Module 012 Focal Point of a Mirror: Question 012.22
- 11 Module 007 Definitions of Force and Mass: Question 007.24
- 12 Module 001 The Path of the Sun: Question 001.52
- 13 Module 009 Speed of a Wave: Question 009.31
- 14 Module 010 Spectra: Question 010.33
- 15 Module 005 The First Physicist: Question 005.11
- 16 Module 002 Phases of the Moon: Question 002.18
- 17 Module 008 Making New Predictions: Question 008.33
- 18 Module 007 Definitions of Force and Mass: Question 007.35
- 19 Module 011 The Reason for Spectra: Question 011.43
- 20 Module 004 Why Copernicus Lost: Question 004.31
- 21 Module 006 The Period-Radius Relation: Question 006.42
- 22 Module 002 Predicting Eclipses: Question 002.44
- 23 Module 006 Equal Area Rule: Question 006.32
- 24 Module 007 The Law of Force and Mass: Question 007.43
- 25 Module 013 Radio Telescopes: Question 013.11
- 26 Module 009 Polarization: Question 009.41
- 27 Module 013 X-Rays: Question 013.44
- 28 Module 010 Temperature and Color: Question 010.22
- 29 Module 011 Atomic Energy Levels: Question 011.31
- 30 Module 011 The Building Blocks: Question 011.13
- 31 Module 008 Explaining Kepler's Laws: Question 008.12
- 32 Module 013 Infrared: Question 013.21
- 33 Module 009 Wavelength: Question 009.12
- 34 Module 012 Telescope Limitations: Question 012.42
- 35 Module 005 Advocate for Copernicus: Question 005.33
- 36 Module 013 Ultraviolet: Question 013.31

- 37 Module 006 Orbits are Ellipses: Question 006.22
- 38 Module 012 Focal Point of a Lens: Question 012.11
- 39 Module 009 Frequency: Question 009.21
- 40 Module 001 Celestial Coordinates: Question 001.26
- 41 Module 008 Unifying Physical Law: Question 008.21
- 42 Module 002 Lunar Eclipses: Question 002.32
- 43 Module 006 Death of a Theory: Question 006.11
- 44 Module 002 Solar Eclipses: Question 002.22
- 45 Module 007 The Law of Inertia: Question 007.13
- 46 Module 003 How to test a statement : Question 003.25
- 47 Module 001 The Celestial Sphere: Question 001.13
- 48 Module 001 Star Motions: Question 001.33
- 49 Module 010 The Electromagnetic Spectrum: Question 010.17
- 50 Module 011 Photons: Question 011.25
- 51 Module 008 Artificial Satellites: Question 008.43
- 52 Module 004 The Copernican System: Question 004.21