EARTH AND SPACE

1. EARTH AND SPACE

Toss Up: Multiple Choice

W) 10^18 meters
X) 10^16 meters
Y) 10^14 meters
Z) 10^12 meters

Toss Up Answer: X

Bonus: Short Answer

What is the name of the space probe that first orbited Saturn?

Bonus Answer: Cassini-Huygens (Accept Cassini)

==========

2. EARTH AND SPACE

Toss Up: Multiple Choice

Which of the following rocks is responsible for the formation of black sand?
W) Quartzite
X) Schist
Y) Basalt
Z) Slate

Toss Up Answer: Y

Bonus: Short Answer

What is the scale used to measure the hardness of minerals?

Bonus Answer: Moh Accept: Moh Scale

==========

3. EARTH AND SPACE

Toss Up: Short Answer

Which type of star will live for the longest period of time?

Bonus Answer: Red Dwarfs (they can live for 1 trillion years or so)

Bonus: Multiple Choice

What resonance does Pluto have with Neptune which ensures that the celestial objects will never impact each other?
W) 2:1
X) 3:2
Y) 5:2
Z) 5:4

Bonus Answer: X

==========

4. EARTH AND SPACE

Toss Up: Short Answer

What are the brightest events in the universe?

Bonus Answer: gamma ray bursts

Bonus: Short Answer

List the following classes of star from hottest to coolest. 1. Class K, 2. Class O, 3. Class A, 4. Class B

Bonus Answer: 2, 4, 3, 1

==========

5. EARTH AND SPACE

Toss Up: Multiple Choice

You find a rock that contains sediments with large grain sizes and angular edges. This rock would most likely be:

W) Shale

X) Conglomerate

Y) Hornfels

Z) Breccia

Toss Up Answer: Z

Bonus: Short Answer

During which two two geologic period did the largest number of species of marine and terrestrial organisms die off?

Bonus Answer: Permian and Triassic

==========

6. EARTH AND SPACE

Toss Up: Multiple Choice

In the Bowen Reaction Series, which of the following minerals would solidify last in a mass of cooling magma?

W) Biotite Mica

X) Pyroxene

Y) Olivine

Z) Amphibole

Toss Up Answer: W

Bonus: Short Answer

What is the name given to any fragmental material produced by a volcanic eruption regardless of composition and fragment size?

Bonus Answer: Tephra

==========

7. EARTH AND SPACE

Toss Up: Multiple Choice

The reason there aren't any active volcanoes in the Himalayan mountain range is because:

W) The Indian plate is composed of basaltic igneous rock, which only melts at higher temperatures.

X) It was formed by localized faults in the Earth's upper crust.

Y) It was formed by the collision of two continental plates with no significant density differences.

Z) It is composed of extinct volcanoes.

Toss Up Answer: Y

Bonus: Short Answer

The South Georgia and the South Sandwich Islands were formed by the collision of which two tectonic plates?

Bonus Answer: South Sandwich Plate and South American Plate

==========

8. EARTH AND SPACE

Toss Up: Short Answer

Thousands of rivers drain the continental United States. These rivers primarily drain into which three bodies of water?

Bonus Answer: GULF OF MEXICO, ATLANTIC OCEAN (ACCEPT: GULF OF ST. LAWRENCE), PACIFIC OCEAN (ACCEPT: SEA OF CORTEZ, GULF OF CALIFORNIA)

Bonus: Short Answer

What is the longest Peninsula in the world?

Bonus Answer: Arabian Peninsula

==========

9. EARTH AND SPACE

Toss Up: Short Answer

What is the second longest Peninsula in the world?

Bonus Answer: Baja California

Bonus: Short Answer

What is a system or group of parallel mountain ranges together with the intervening plateaus and other features?

Bonus Answer: Cordillera

==========

10. EARTH AND SPACE

Toss Up: Short Answer

What mountain has the highest point in the Western Hemisphere?

Bonus Answer: Mt. Aconcagua

Bonus: Multiple Choice

Which of the following describes how sea ice is different from continental ice?

W) Continental ice is denser than sea ice

X) Sea ice is saline while continental ice is fresh

Y) Sea ice floats on the water while continental ice sits on land

Z) Sea ice is constantly changing while continental ice remains the same

Bonus Answer: Y

==========

11. EARTH AND SPACE

Toss Up: Short Answer

A solar eclipse can only occur at what phase of the moon?

Bonus Answer: New Moon

Bonus: Short Answer

What constellation cannot be seen in the summer sky of the northern hemisphere?

Bonus Answer: Orion

==========

12. EARTH AND SPACE

Toss Up: Multiple Choice

What percent of Sun-like stars in the sky that appear to be single stars are actually binary stars?

W) About 25%

X) About 35%

Y) About 50%

Z) About 60%

Toss Up Answer: Y

Bonus: Short Answer

What is the 29 ½ days it takes the Moon to complete an orbit around the Earth called?

Bonus Answer: Synodic month

==========

13. EARTH AND SPACE

Toss Up: Multiple Choice

Light from distant galaxies comes mostly from which of the following?

W) Planets

X) Low mass stars
Y) High mass stars
Z) Black holes

Toss Up Answer: Y

Bonus: Multiple Choice
Which planet has the highest escape velocity?
W) Mercury
X) Earth
Y) Uranus
Z) Jupiter

Bonus Answer: Z

==========

14. EARTH AND SPACE

Toss Up: Short Answer
What is the term for the amount of energy released from each square meter of an object's surface each second?
Bonus Answer: Energy flux

Bonus: Short Answer
Give another name for the Pleiades.
Bonus Answer: M45 or The Seven Sisters or The False Dipper

==========

15. EARTH AND SPACE

Toss Up: Short Answer
What is a pulsating variable star whose brightness varies in a very regular time period of about 1-50 days?
Bonus Answer: Cepheid

Bonus: Short Answer
What is the part of the Sun that we can see without any instruments?
Bonus Answer: Photosphere

==========

16. EARTH AND SPACE

Toss Up: Short Answer
All of Saturn's moons are composed predominantly of what substance?
Bonus Answer: Ice

Bonus: Short Answer
What are the scientific names for the two regions of a sunspot?
Bonus Answer: Umbra and penumbra

==========

17. EARTH AND SPACE

Toss Up: Short Answer
The Kappa Cygnids and the Northern Delta Aquarids are names for what phenomena?
Bonus Answer: Meteor Showers

Bonus: Short Answer
What substance is responsible for Neptune's blue-green color?
Bonus Answer: Methane gas (accept methane)

==========

18. EARTH AND SPACE

Toss Up: Multiple Choice

What upwelling ocean current off the coast of South America causes the most productive marine ecosystem in the world?

W) Gulf Stream

X) South Pacific Gyre

Y) Humboldt Current

Z) Cromwell Current

Toss Up Answer: Y

Bonus: Short Answer

What is the coldest planet in the solar system?

Bonus Answer: Uranus

==========

19. EARTH AND SPACE

Toss Up: Short Answer

Order the four gas giants in size from the largest to the smallest.

Bonus Answer: Jupiter, Saturn, Uranus, Neptune

Bonus: Multiple Choice

Which one of these statements about Neptune's moon, Triton, is true?

W) It orbits in retrograde motion.

X) Its orbit is highly eccentric.

Y) It fractured billions of years ago and reformed.

Z) It does not have an atmosphere.

Bonus Answer: W

==========

20. EARTH AND SPACE

Toss Up: Multiple Choice

Which of the following minerals breaks in parallel sheets?

W) Pyroxene

X) Halite

Y) Muscovite

Z) Calcite

Toss Up Answer: Y

Bonus: Multiple Choice

During a supernova, what percentage of the total energy released is composed of neutrinos?

W) 10

X) 50

Y) 75

Z) 99

Bonus Answer: Z

==========

21. EARTH AND SPACE

Toss Up: Multiple Choice

Which corner of the H-R diagram would a white dwarf most likely be found?
W) Upper Left
X) Lower Left
Y) Upper Right
Z) Lower Right
Toss Up Answer: X

Bonus: Short Answer
What element is the penultimate element formed in the core of a supergiant?
Bonus Answer: Silicon

==========

22. EARTH AND SPACE

Toss Up: Short Answer
What is the term used to describe silt and mud deposited by a stream during periods of high water?
Bonus Answer: Alluvial

Bonus: Multiple Choice
Which radioactive element is generally present in smoke detectors today?
W) Americium
X) Radium
Y) Radon
Z) Actinium

Bonus Answer: W

==========

23. EARTH AND SPACE

Toss Up: Short Answer
In approximately 4 billion years, another galaxy is predicted to collide with the Milky Way. What is the name of this galaxy?
Bonus Answer: Andromeda

Bonus: Multiple Choice
What is the third most abundant element in the universe?
W) Helium
X) Lithium
Y) Carbon
Z) Oxygen

Bonus Answer: Z

==========

24. EARTH AND SPACE

Toss Up: Multiple Choice
In which constellation is the closest Cepheid variable to Earth?
W) Ursa Minor
X) Lyra
Y) Carina
Z) Sagittarius
Toss Up Answer: W

Bonus: Short Answer

Polaris will be further to the north celestial pole in 3000 AD than Altai. What phenomenon is mostly responsible for this?

Bonus Answer: Precession of the equinoxes

==========

25. EARTH AND SPACE

Toss Up: Multiple Choice

What star class is used to characterize the hottest stars?

W) A

X) B

Y) M

Z) O

Toss Up Answer: Z

Bonus: Short Answer

Which two moons are larger than the smallest planet in our solar system?

Bonus Answer: Ganymede and Titan

==========

26. EARTH AND SPACE

Toss Up: Short Answer

What is the name for a section of the Earth's crust that has been displaced, but that still maintains its internal structure?

Bonus Answer: massif

Bonus: Multiple Choice

Which of the following is a metamorphic form of shale?

W) quartzite

X) slate

Y) marble

Z) schist

Bonus Answer: X

==========

27. EARTH AND SPACE

Toss Up: Multiple Choice

What is closest to the ratio of the total mass of the asteroids of the asteroid belt to the mass of the moon?

W) 100

X) 10

Y) 1

Z) 0.1

Toss Up Answer: Z

Bonus: Short Answer

What is currently believed to be the reason that the asteroid belt, rather than another planet, formed in that region of the solar system?

Bonus Answer: Gravitational disturbance by Jupiter prevented sufficient accretion of matter

==========

28. EARTH AND SPACE

Toss Up: Multiple Choice

Stars in which portion of an Hertzsprung-Russel diagram are most likely to have supernova deaths?

W) Bottom right

X) Bottom left
Y) Top right
Z) Center

Toss Up Answer: Y

Bonus: Multiple Choice

What characteristics do stars in this region of the diagram have compared to those in the other regions?
W) Hot surface temperature and bright
X) Cool surface temperature and bright
Y) Hot surface temperature and dim
Z) Cool surface temperature and dim

Bonus Answer: X

==========

29. EARTH AND SPACE

Toss Up: Short Answer

What type of rock comes in layers?

Bonus Answer: Sedimentary

Bonus: Short Answer

What color is a flame of lithium?

Bonus Answer: red

==========

30. EARTH AND SPACE

Toss Up: Short Answer

Which planet has the least eccentric orbit?

Bonus Answer: Venus

Bonus: Short Answer

What are the two densest planets in our solar system?

Bonus Answer: Earth and Mercury (accept in any order)

==========

31. EARTH AND SPACE

Toss Up: Short Answer

What star has the greatest apparent magnitude

Bonus Answer: Sun

Bonus: Multiple Choice

Which planet or planets rotate in retrograde?
W) Venus
X) Uranus
Y) Venus and Uranus
Z) Uranus and Jupiter

Bonus Answer: Y

==========

32. EARTH AND SPACE

Toss Up: Multiple Choice

What is the name for the apparent line dividing night and day

W) Seperator
X) Day-Night Meridian
Y) Terminator
Z) Prime Meridian
Toss Up Answer: Y

Bonus: Short Answer
What Gas Giant emits the least amount of energy percentage-wise, based on the total amount of energy it recieves from the sun?
Bonus Answer: Uranus

==========

33. EARTH AND SPACE

Toss Up: Multiple Choice
What is defined to be the distance from the Sun, to a body whose stellar parallax is one arcsecond?
W) astronomical unit
X) Schwarzschild radius
Y) parsec
Z) light-second

Toss Up Answer: Y

Bonus: Multiple Choice
An amateur astronomer observes a star over the course of a year and finds that from January 1 to June 1, the star's position on the celestial sphere shifts by 3 arcseconds. How far is the star from the Earth, to the nearest tenth of a parsec?
W) 3
X) 0.3
Y) 1.5
Z) 0.7

Bonus Answer: Z

==========

34. EARTH AND SPACE

Toss Up: Short Answer
Which planet in the solar system has the greatest albedo?
Bonus Answer: Venus

Bonus: Multiple Choice
What gas is most abundant in the troposphere of Venus?
W) Carbon dioxide
X) Nitrogen
Y) Sulfur dioxide
Z) Methane

Bonus Answer: W

==========

35. EARTH AND SPACE

Toss Up: Short Answer
From what body do astronomers believe most comets originate?
Bonus Answer: The Oort Cloud

Bonus: Short Answer

Which tail of a comet is always directed in the opposite direction of the Sun?

Bonus Answer: The ion tail (accept: gas tail. Reject dust tail as incorrect.)

==========

36. EARTH AND SPACE

Toss Up: Short Answer

What body is the most volcanic in the solar system?

Bonus Answer: Io

Bonus: Short Answer

What effect gives Io the energy for this volcanic activity?

Bonus Answer: Tidal heating (accept: tidal friction, tidal forces, tidal forces by Jupiter, tidal forces by Jupiter and its moons)

==========

37. EARTH AND SPACE

Toss Up: Short Answer

What behavior of Mercury could not be explained by Newtonian mechanics, and perplexed the astronomical community until it was explained by General Relativity?

Bonus Answer: Precession of its orbit (accept: advance of its perihelion; advance of its periapsis)

Bonus: Short Answer

The space race between the United States and the Soviet Union was a big deal for the two nations in the 1960's and early 1970's. In 1971, NASA deployed the first spacecraft ever to orbit a another planet, and beat the USSR's deployment by a month. What planet did the NASA mission orbit?

Bonus Answer: Mars

==========

38. EARTH AND SPACE

Toss Up: Multiple Choice

What type of star has the most similar characteristics to Jupiter and does not necessarily perform nuclear fusion?

W) Red dwarf

X) White dwarf

Y) Brown dwarf

Z) Hot Jupiter

Toss Up Answer: Y

Bonus: Short Answer

What mechanism occurs in Jupiter and in brown dwarfs, and is responsible for Jupiter radiating more energy than it receives from the Sun?

Bonus Answer: Kelvin–Helmholtz mechanism (accept: the outer layers cool and the object compresses, which then heats up the core)

==========

39. EARTH AND SPACE

Toss Up: Short Answer

What is the name of the plane on which the planets and Sun of the solar system move?

Bonus Answer: The ecliptic

Bonus: Short Answer

"Planet" means "wanderer", as the ancients saw that planets, unlike stars, sometimes move forward with the stars through the sky and sometimes change direction and move in the opposite direction. What are the names of these two

types of motion through the sky?

Bonus Answer: Retrograde and prograde

==========

40. EARTH AND SPACE

Toss Up: Multiple Choice

A red dwarf is

W) A large variation of brown dwarf

X) The remnant of a main sequence star

Y) A small and cool star in the main sequence

Z) Unable to complete nuclear fusion

Toss Up Answer: Y

Bonus: Short Answer

What type of star will the Sun become once it leaves the main sequence?

Bonus Answer: Red giant

==========

41. EARTH AND SPACE

Toss Up: Multiple Choice

Sunspots exist on which layer of the sun?

W) Heliosphere

X) Photosphere

Y) Chromosphere

Z) Corona

Toss Up Answer: X

Bonus: Multiple Choice

Sunspots are characterized by

W) High magnetic field flux, and cooler temperature

X) High magnetic field flux, and hotter temperature

Y) Low magnetic field flux, and cooler temperature

Z) Low magnetic field flux, and hotter temperature

Bonus Answer: W

==========

42. EARTH AND SPACE

Toss Up: Multiple Choice

Sunspots and other solar activity tend to follow a cycle lasting about how long?

W) 1 year

X) 11 years

Y) 23 years

Z) 57 years

Toss Up Answer: X

Bonus: Short Answer

Identify each of the following solar events that is correctly paired with its origin

1. Prominence; the photosphere
2. Solar filament; the chromosphere
3. Coronal mass ejection; the corona

Bonus Answer: 1, 3

==========

43. EARTH AND SPACE

Toss Up: Multiple Choice

A pulsar is a particular type of:

W) Neutron star

X) Black hole

Y) White dwarf

Z) Black dwarf

Toss Up Answer: W

Bonus: Short Answer

What does the Schwarzschild (pronounced: Sh-worts-shield) radius of a body represent?

Bonus Answer: The radius which, if all of the mass of the body were contained within it, the body would become a black hole (or: its escape velocity would be greater than C).

==========

44. EARTH AND SPACE

Toss Up: Short Answer

Observation of the phases of which planet gave Galileo evidence for the Copernican model.

Bonus Answer: Venus

Bonus: Short Answer

Name the four Galilean Satellites

Bonus Answer: Io, Europa, Ganymede, Callisto

==========

45. EARTH AND SPACE

Toss Up: Multiple Choice

Earth is farthest from the Sun during the Northern Hemisphere's summer, and Earth is closest to the Sun during the Northern Hemisphere's winter. During which season in the Northern Hemisphere is Earth's orbital velocity greatest?

W) Winter

X) Spring

Y) Summer

Z) Fall

Toss Up Answer: W

Bonus: Multiple Choice

Which information about a nearby star must be known to determine its distance from an observer?

W) size

X) color

Y) temperature

Z) parallax

Bonus Answer: Z

==========

46. EARTH AND SPACE

Toss Up: Multiple Choice

Which observation provides the best evidence that Earth rotates?

W) The position of the planets among the stars changes during the year.

X) The location of the constellations in relationship to Polaris changes from month to month.

Y) The length of the shadow cast by a flagpole at noontime changes from season to season.

Z) The direction of swing of a freely swinging pendulum changes during the day.

Toss Up Answer: Z

Bonus: Multiple Choice

Earth's axis of rotation is tilted twenty three and a half degrees from a line perpendicular to the plane of its orbit. What would be the result if the tilt was increased to thirty three and a half degrees?

W) an increase in the amount of solar radiation received by Earth.

X) colder winters and warmer summers in New York State

Y) less difference between winter and summer temperatures in New York State

Z) shorter days and longer nights at the Equator

Bonus Answer: X

==========

47. EARTH AND SPACE

Toss Up: Multiple Choice

The best evidence of Earth's nearly spherical shape is obtained through

W) telescopic observations of other planets

X) photographs of Earth from an orbiting satellite

Y) observations of the Sun's altitude made during the day

Z) observations of the Moon made during solar eclipses

Toss Up Answer: X

Bonus: Short Answer

Earth's spherical shape "bulges" very slightly at the Equator and is very slightly "flattened" at the poles. What is this shape called?

Bonus Answer: oblate spheroid

==========

48. EARTH AND SPACE

Toss Up: Multiple Choice

The time between two successive passages of the Sun across a given meridian is called a

W) civil day

X) conventional day

Y) mean solar day

Z) solar day

Toss Up Answer: Z

Bonus: Short Answer

What is the time from when a star crosses an observers meridian until the same star next crosses the observer's meridian called?

Bonus Answer: sidereal day

==========

49. EARTH AND SPACE

Toss Up: Multiple Choice

Which observation provides the best evidence that Earth revolves around the Sun?

W) Stars seen from Earth appear to circle Polaris

X) Earth's planetary winds are deflected by the Coriolis effect

Y) The change from high ocean tide to low ocean tide is a repeating pattern

Z) Different star constellations are seen from Earth at different times of the year.

Toss Up Answer: Z

Bonus: Short Answer

What is the name of the paradox that asks why the night sky is dark if the universe is infinite and should contain an infinite about of stars?

Bonus Answer: Olbers paradox

==========

50. EARTH AND SPACE

Toss Up: Multiple Choice

Which instrument is used to study the composition of stars?

W) sextant

X) spectroscope

Y) seismograph

Z) chronometer

Toss Up Answer: X

Bonus: Multiple Choice

An observer viewing the sky through a telescope sees a fuzzy, glowing region in the constellation Orion. The region has an irregular shape, and some stars seem to be shining through it. The observer is most likely viewing a

W) planet

X) comet

Y) meteor

Z) nebula

Bonus Answer: Z

==========

51. EARTH AND SPACE

Toss Up: Multiple Choice

Which of the following statements best describes the difference between a galaxy and a nebula?

W) A galaxy consists of stars; a nebula consists of dust and gas.

X) There are two types of nebula, but only one type of galaxy.

Y) A galaxy always emits light; a nebula never emits light.

Z) A galaxy consists of matter; a nebular consists of energy.

Toss Up Answer: W

Bonus: Short Answer

What is the plot of luminosity versus surface temperature for stars, discovered independently by two astronomers, called?

Bonus Answer: Hertzsprung-Russell Diagram (H-R diagram)

==========

52. EARTH AND SPACE

Toss Up: Multiple Choice

A star like Earth's Sun will eventually

W) explode in a supernova

X) become a black hole

Y) change into a white dwarf

Z) become a neutron star

Toss Up Answer: Y

Bonus: Multiple Choice

Two nebulae, A and B, of equal volume are beginning to contract and form stars A and B. Nebula A has 10,000 times the mass of nebula B. Which of the following predictions is most accurate?

W) Star A will use up its fuel faster than star B.

X) Star A will probably be much redder than star B.

Y) Star B will be much hotter than star A.

Z) Stars A and B will be identical in volume.

Bonus Answer: W

==========

53. EARTH AND SPACE

Toss Up: Multiple Choice

The surface of Venus is much hotter than would be expected, considering its distance from the Sun. Which statement best explains this fact?

W) Venus has many active volcanoes.

X) Venus as a slow rate of rotation

Y) The clouds of Venus are highly reflective

Z) The atmosphere of Venus contains a high percentage of carbon dioxide.

Toss Up Answer: Z

Bonus: Multiple Choice

The existence of Pluto and Neptune was accurately predicted through the study of the movements of

W) comets

X) other planets

Y) stars

Z) the Sun

Bonus Answer: X

==========

54. EARTH AND SPACE

Toss Up: Multiple Choice

Rock samples brought back from the Moon show absolutely no evidence of chemical weathering. This is most likely due to

W) the lack of an atmosphere on the Moon

X) extremely low surface temperatures on the Moon

Y) lack of biological activity on the Moon

Z) large quantities of water in the lunar "seas"

Toss Up Answer: W

Bonus: Multiple Choice

A major belt of asteroids is located between Mars and Jupiter. What is the approximate average distance between the Sun and this major asteroid belt?

W) 110 million kilometers

X) 220 million kilometers

Y) 390 million kilometers

Z) 850 million kilometers

Bonus Answer: Y

==========

55. EARTH AND SPACE

Toss Up: Multiple Choice

Which statement best describes how galaxies generally move?

W) Galaxies move toward one another.

X) Galaxies move away from one another.

Y) Galaxies move randomly.

Z) Galaxies do not move.

Toss Up Answer: X

Bonus: Multiple Choice

The observable universe is estimated to be roughly 16-20 billion years old. Which statement best describes why a galaxy located 25 billion light-years from Earth may not be visible to an observer on Earth?

W) Galaxies 25 billion light-years away would emit no visible light.

X) Light from beyond 20 billion light years has not yet reached Earth.

Y) Light from beyond 20 billion light years passed out galaxy before Earth existed.

Z) No galaxies are located farther than 5 billion light-years from Earth.

Bonus Answer: X

==========

56. EARTH AND SPACE

Toss Up: Multiple Choice

Within the early Earth's vast molten region, substances underwent a process known as differentiation, during which

W) substanes of low density rise to Earth's surface, while those of high density sink toward its center

X) substances of high density float to Earth's surface, while those of low density sink toward its center.

Y) substances of high and low density chemically combine to form uniformly dense substances.

Z) substances of high density form gases, while those of low density form solids.

Toss Up Answer: W

Bonus: Multiple Choice

Earth's magnetic field is likely a result of

W) convection currents in Earth's mantle

X) convection currents in Earth's core

Y) a high concentration of iron in Earth's crust

Z) high-energy particles in the solar wind

Bonus Answer: X

==========

57. EARTH AND SPACE

Toss Up: Multiple Choice

Which of the following models of the Moon's origin is currently considered most likely?

W) The Moon was spun off by a rapidly spinning, molten Earth.

X) The Moon was a passing body that was captured by Earth's gravity.

Y) The Moon formed in place at the same time that Earth formed.

Z) The Moon was ejected from a molten Earth by a giant impact.

Toss Up Answer: Z

Bonus: Multiple Choice

In which parts of Earth's interior would melted or partially melted material be found?

W) stiffer mantle and inner core

X) stiffer mantle and outer core

Y) crust and inner core

Z) asthenosphere and outer core

Bonus Answer: Z

==========

58. EARTH AND SPACE

Toss Up: Multiple Choice

Which radioactive isotope is most useful for determining the age of mastodont bones found in late Pleistocene sediments?

W) U-238

X) C-14

Y) K-40

Z) Rb-87

Toss Up Answer: X

Bonus: Multiple Choice

The absolute age of a rock is the approximate number of years ago that the rock formed. The absolute age of an igneous rock can best be determined by

W) comparing the amounts of decayed and undecayed radioactive isotopes in the rock

X) omparing the sizes of the crystals found in the upper and lower parts of the rock

Y) examining the rock’s relative position in a rock outcrop

Z) examining the environment in which the rock is found

Bonus Answer: W

==========

59. EARTH AND SPACE

Toss Up: Multiple Choice

When a star undergoes helium flash, it fuses helium into which of the following elements?

W) Lithium

X) Beryllium

Y) Oxygen

Z) Carbon

Toss Up Answer: Z

Bonus: Short Answer

Order the following 4 elements in most to least abundant in the solar system: 1. Carbon, 2. Hydrogen, 3. Oxygen, 4. Helium

Bonus Answer: 2 (Hydrogen), 4(Helium), 3(Oxygen), 1(Carbon)

==========

60. EARTH AND SPACE

Toss Up: Short Answer

As of 2016, what is the innermost planet that has an orbital period longer than the average lifespan?

Bonus Answer: Uranus

Bonus: Multiple Choice

What percentage of the total mass of the planets do Jupiter and Saturn make up?

W) 50

X) 75

Y) 90

Z) 95

Bonus Answer: Y

==========

61. EARTH AND SPACE

Toss Up: Short Answer

What paradox asks why we haven't found extraterrestrial life yet?

Bonus Answer: Fermi Paradox

Bonus: Short Answer

If a star is said to be 1.4 times more massive than the Sun, respectively, what threshold is it said to have passed, and what will it become in the future?

Bonus Answer: 1) Chandrasekhar limit, 2) supernova

==========

62. EARTH AND SPACE

Toss Up: Short Answer

What are the three types of asteroids, classified based on composition?

Bonus Answer: C-type (accept carbonaceous), M-type (accept metal-rich), S-type (accept silicate)

(Accept in any order)

Bonus: Short Answer

Order these three types of asteroid from most common to least common in the asteroid belt.

Bonus Answer: C-type (accept carbonaceous), S-type (accept silicate), M-type (accept metal-rich)

About 75% of visible asteroids in the asteroid belt are carbonaceous, about 17% are silicate asteroids, and about 10% are metal-rich asteroids

==========

63. EARTH AND SPACE

Toss Up: Short Answer

What hypothetical structure is believed to mark the end of the Sun's Hill Sphere?

Bonus Answer: Oort Cloud

Bonus: Short Answer

The time between two successive meridian transits of the Sun as observed from a stationary spot on the Earth's surface is called

Bonus Answer: A day (a solar day)

==========

64. EARTH AND SPACE

Toss Up: Short Answer

After reaching what mass can a white dwarf no longer remain stable?

Bonus Answer: The Chandrasekhar Limit

Bonus: Short Answer

What is the pressure that prevents the gravitational collapse of a stable white dwarf?

Bonus Answer: Electron degeneracy pressure

==========

65. EARTH AND SPACE

Toss Up: Short Answer

Order the following structures by descending concentration of stars:

1. Globular cluster
2. Arms of the Milky Way
3. Bulge of the Milky Way
4. Halo of the Milky Way

Bonus Answer: 1, 3, 2, 4

Bonus: Short Answer

What stellar Population is most common in globular clusters?

Bonus Answer: Population II (accept "2")

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66. EARTH AND SPACE

Toss Up: Multiple Choice

In August 2012, it was announced that Voyager 1 had exited the Solar System. What boundary did the spacecraft cross to merit this announcement?

W) Termination Shock

X) Heliosheath

Y) Heliopause

Z) The Oort Cloud

Toss Up Answer: Y

Bonus: Multiple Choice

What is Voyager 1's primary source of power?

W) Solar cells

X) Radioactive decay

Y) Thermal cells

Z) Voyager 1 is not generating power

Bonus Answer: X

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67. EARTH AND SPACE

Toss Up: Short Answer

What month does earth's perihelion occur in?

Bonus Answer: January

Bonus: Multiple Choice

What is the name of the supercontinent that formed about 600 million years ago, just before Pangaea?

W) Pannotia

X) Ur

Y) Laurentia

Z) Columbia

Bonus Answer: W

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68. EARTH AND SPACE

Toss Up: Multiple Choice

Which of the following parts of the sun has the lowest temperature

W) Corona

X) Chromosphere

Y) Transition region

Z) Photosphere

Toss Up Answer: Z

Bonus: Short Answer

Throughout the second half of the 20th century, the number of neutrinos measured coming from the Sun was a third of the theoretically predicted number. What behavior of neutrinos revealed that the predicted number of neutrinos were, indeed, being released?

Bonus Answer: Neutrino oscillation (accept: neutrinos change flavor)

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