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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. Earth consists of two types of crust: lithospheric and oceanic.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | |

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| 2. The solar nebula theory of the formation of the solar system accounts for the differences in composition between the terrestrial and Jovian planets.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | |

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| 3. Earth’s composition was originally homogeneous.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | |

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| 4. According to the theory of creation, all living organisms are related and they descended, with some modifications, from organisms that lived in the past.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | |

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| 5. The central thesis of the theory of organic evolution is that the diversity of species on Earth in the past is the same as that of today.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | |

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| 6. Natural selection refers to the ability of organisms to choose the habitat in which they feel most comfortable.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | |

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| 7. The geologic time scale was first developed in the 19th century using radiometric-dating techniques.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | |

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| 8. The principle of uniformitarianism is based on the idea that modern processes have operated throughout geologic time.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | |

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| 9. According to the principle of uniformitarianism, processes have occurred at the same rates throughout geologic time.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | False | |

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| 10. Geologists use the Principle of Uniformitarianism as a basis to interpret the past and predict the future.   |  |  |  | | --- | --- | --- | |  | a. | True | |  | b. | False |  |  |  | | --- | --- | | *ANSWER:* | True | |

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| 11. What theory explains the formation of a differentiated Earth consisting of layers?   |  |  |  | | --- | --- | --- | |  | a. | Darwin’s theory | |  | b. | plate tectonic theory | |  | c. | Einstein’s Theory of Relativity | |  | d. | homogeneous accretion theory | |  | e. | Big Bang |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 12. According to most scientists, what is the greatest environmental problem facing the world today?   |  |  |  | | --- | --- | --- | |  | a. | climate change | |  | b. | the ozone hole | |  | c. | water pollution | |  | d. | overpopulation | |  | e. | waste disposal |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 13. Most scientists believe that the Big Bang took place approximately \_\_\_\_ years ago.   |  |  |  | | --- | --- | --- | |  | a. | 140 billion | |  | b. | 40 billion | |  | c. | 14 billion | |  | d. | 140 million | |  | e. | 40 million |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 14. What type of rocks form at or near Earth’s surface?   |  |  |  | | --- | --- | --- | |  | a. | foliated rocks | |  | b. | nonfoliated rocks | |  | c. | sedimentary rocks | |  | d. | igneous rocks | |  | e. | metamorphic rocks |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 15. At the moment of the Big Bang, \_\_\_\_.   |  |  |  | | --- | --- | --- | |  | a. | all matter and energy were compressed into an infinitely small high-temperature and high-density state | |  | b. | all matter and energy were infinitely expanded to populate the exact size of the universe | |  | c. | the universe was entirely made of infinitely dense matter, because energy had not yet come into existence | |  | d. | the universe in existence up to that point collapsed and inverted to became the current universe | |  | e. | all of the chemical elements seen in the universe today were forged into existence |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 16. What are the terrestrial planets?   |  |  |  | | --- | --- | --- | |  | a. | Jupiter, Saturn, Uranus, and Neptune | |  | b. | Mercury, Venus, Earth, and Mars | |  | c. | Earth, Mars, and Jupiter | |  | d. | Uranus, Neptune, and Pluto | |  | e. | Mercury, Earth, Mars, and Pluto |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 17. What is the zone between Earth’s core and crust?   |  |  |  | | --- | --- | --- | |  | a. | innersphere | |  | b. | lithosphere | |  | c. | mantle | |  | d. | convection center | |  | e. | molten zone |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 18. Earth's core is likely to be \_\_\_\_.   |  |  |  | | --- | --- | --- | |  | a. | composed of rock with high silica content | |  | b. | hollow | |  | c. | molten throughout | |  | d. | composed of potassium and aluminum rich silicates | |  | e. | composed primarily of iron |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 19. Which of the following is a characteristic of the asthenosphere?   |  |  |  | | --- | --- | --- | |  | a. | It lies beneath the lithosphere. | |  | b. | It is a rigid rock layer. | |  | c. | It is broken into plates. | |  | d. | It is more dense than the core. | |  | e. | It comprises the lower mantle. |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 20. What comprises the ocean crust?   |  |  |  | | --- | --- | --- | |  | a. | sedimentary rocks | |  | b. | peridotite | |  | c. | igneous rocks | |  | d. | metamorphic rocks | |  | e. | granite |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 21. What theory proposes that all living organisms are descendants of different life forms that existed in the past?   |  |  |  | | --- | --- | --- | |  | a. | organic evolution | |  | b. | astrology | |  | c. | paleontology | |  | d. | plate tectonics | |  | e. | natural selection |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 22. In the 1800s, what provided a means for dating rocks and allowed for a relative geologic time scale to be constructed?   |  |  |  | | --- | --- | --- | |  | a. | seismic measurements | |  | b. | carbon dating | |  | c. | climate change studies | |  | d. | magma studies | |  | e. | succession of fossils in the rock record |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 23. What are the three types of plate boundaries?   |  |  |  | | --- | --- | --- | |  | a. | mid-ocean ridge, trench, and divergent | |  | b. | mid-ocean ridge, divergent, and convergent | |  | c. | divergent, convergent, and transform | |  | d. | convergent, transform, and trench | |  | e. | mid-ocean ridge, convergent, and trench |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 24. Sudden or catastrophic events, such as volcanic eruptions and tsunami, can be explained by \_\_\_\_.   |  |  |  | | --- | --- | --- | |  | a. | big bang theory | |  | b. | theory of natural selection | |  | c. | third law of thermodynamics | |  | d. | principle of uniformitarianism | |  | e. | scientific method |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 25. Which subsystem of Earth supplies heat for convection in the mantle?   |  |  |  | | --- | --- | --- | |  | a. | atmosphere | |  | b. | hydrosphere | |  | c. | biosphere | |  | d. | core | |  | e. | lithosphere |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 26. What is the study of Earth materials and the processes operating within Earth and on its surface?   |  |  |  | | --- | --- | --- | |  | a. | physical geography | |  | b. | meteorology | |  | c. | geomorphology | |  | d. | historical geology | |  | e. | physical geology |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 27. What technique injects fluids under very high pressure into organic-rich shales to recover trapped natural gas?   |  |  |  | | --- | --- | --- | |  | a. | mechanical fracturing | |  | b. | hydraulic fracturing | |  | c. | pressurized mining | |  | d. | stress mining | |  | e. | hydraulic drilling |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 28. What are the subdivisions of the geologic time scale, listed in order from longest to shortest time intervals?   |  |  |  | | --- | --- | --- | |  | a. | eon, era, period, and epoch | |  | b. | epoch, eon, era, and period | |  | c. | eon, epoch, period, and era | |  | d. | era, eon, period, and epoch | |  | e. | eon, era, epoch, and period |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 29. Which basic force binds atoms into molecules?   |  |  |  | | --- | --- | --- | |  | a. | gravity | |  | b. | molecular affinity | |  | c. | strong nuclear | |  | d. | electromagnetic | |  | e. | weak nuclear |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 30. Which basic force is responsible for the breakdown of an atom’s nucleus, thereby producing radioactive decay?   |  |  |  | | --- | --- | --- | |  | a. | electromagnetic | |  | b. | weak nuclear | |  | c. | strong nuclear | |  | d. | molecular affinity | |  | e. | interstitial |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 31. What are the two types of crust?   |  |  |  | | --- | --- | --- | |  | a. | oceanic and continental | |  | b. | inner crust and outer crust | |  | c. | lower crust and upper crust | |  | d. | terrestrial and aquatic | |  | e. | metamorphic and sedimentary |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 32. Compared with their overall size, the \_\_\_\_ planets have small rocky cores.   |  |  |  | | --- | --- | --- | |  | a. | Descartes | |  | b. | terrestrial | |  | c. | Jovian | |  | d. | nebular | |  | e. | dwarf |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 33. Tentative explanations that are formulated to explain observed phenomena are known as \_\_\_\_.   |  |  |  | | --- | --- | --- | |  | a. | tautologies | |  | b. | theories | |  | c. | conjectures | |  | d. | perspectives | |  | e. | hypotheses |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 34. What is a characteristic of the greenhouse effect?   |  |  |  | | --- | --- | --- | |  | a. | Short wavelength radiation from the sun is reflected back into space. | |  | b. | Most of Earth’s radiant energy escapes into space. | |  | c. | Industrialization plays an exclusive role in the process. | |  | d. | Gases trap heat reflected back from Earth’s surface. | |  | e. | Transpiration significantly increases levels of greenhouse gases. |  |  |  | | --- | --- | | *ANSWER:* | d | |

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| 35. \_\_\_\_ is known to be a dwarf planet.   |  |  |  | | --- | --- | --- | |  | a. | Neptune | |  | b. | Pluto | |  | c. | Uranus | |  | d. | Mars | |  | e. | Titan |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 36. What are naturally occurring, inorganic, crystalline solids that have definite physical and chemical properties?   |  |  |  | | --- | --- | --- | |  | a. | rocks | |  | b. | minerals | |  | c. | stalactites | |  | d. | stalagmites | |  | e. | lithified deposits |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 37. What parallel alignment of minerals is caused by the application of pressure, and gives a rock a layered or banded appearance?   |  |  |  | | --- | --- | --- | |  | a. | striation | |  | b. | foliation | |  | c. | marbling | |  | d. | metamorphism | |  | e. | crystallization |  |  |  | | --- | --- | | *ANSWER:* | b | |

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| 38. Which process results in the formation of sedimentary rocks?   |  |  |  | | --- | --- | --- | |  | a. | precipitation of mineral matter from solution | |  | b. | chemical activity of fluids | |  | c. | crystallization of lava flow | |  | d. | accumulation of magma | |  | e. | heat compression of other rocks |  |  |  | | --- | --- | | *ANSWER:* | a | |

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| 39. What theory has the central thesis that all present-day organisms are related and that they have descended with modifications from organisms that lived in the past?   |  |  |  | | --- | --- | --- | |  | a. | theory of relativism | |  | b. | best-fit theory | |  | c. | theory of organic evolution | |  | d. | unifying theory | |  | e. | theory of uniformitarianism |  |  |  | | --- | --- | | *ANSWER:* | c | |

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| 40. What unifying theory of geology holds that large segments of Earth’s outer part move relative to one another?   |  |  |  | | --- | --- | --- | |  | a. | lithospheric zone theory | |  | b. | convection cell theory | |  | c. | subduction zone theory | |  | d. | plate cycle theory | |  | e. | plate tectonic theory |  |  |  | | --- | --- | | *ANSWER:* | e | |

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| 41. A combination of related parts that interact in an organized fashion is a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | system | |

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| 42. The basic force that is the attraction of one body toward another is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | gravity | |

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| 43. The increasing percentage of heavier elements in the universe results from nuclear fusion during the evolution of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | stars | |

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| 44. Earth formed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ billion years ago.   |  |  | | --- | --- | | *ANSWER:* | 4.6 | |

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| 45. The state of matter of the material in Earth's inner core is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | solid | |

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| 46. Earth’s concentric layer that has the largest volume is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | mantle | |

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| 47. The crust and the underlying uppermost mantle make up the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | lithosphere | |

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| 48. Rocks that form from the crystallization of lava or magma are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rocks.   |  |  | | --- | --- | | *ANSWER:* | igneous | |

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| 49. A change in the frequency of a sound, light, or other wave caused by movement of the wave’s source relative to the observer is known as the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | Doppler effect | |

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| 50. The study of the origin, evolution, and nature of the universe is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   |  |  | | --- | --- | | *ANSWER:* | cosmology | |

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| 51. What are the primary characteristics of the terrestrial planets in our solar system?   |  |  | | --- | --- | | *ANSWER:* | The terrestrial planets − Mercury, Venus, Earth, and Mars − are all small and are composed of rock and metallic elements that condensed at the high temperatures of the inner solar nebula. | |

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| 52. What three general characteristics account for the density differences among the concentric layers of Earth?   |  |  | | --- | --- | | *ANSWER:* | Earth consists of three concentric layers: the core, the mantle, and the crust. This orderly division results from density differences between the layers as a function of variations in composition, temperature, and pressure. | |

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| 53. What is the basic premise of the principle of uniformitarianism?   |  |  | | --- | --- | | *ANSWER:* | The principle of uniformitarianism is based on the premise that present-day processes have operated throughout geologic time.The physical and chemical laws of nature have remained the same over time. Thus, even though the rates and intensities of geologic processes have varied during the past, the physical and chemical laws of nature have remained the same. | |

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| 54. List two fundamental phenomena that indicate that the Big Bang occurred.   |  |  | | --- | --- | | *ANSWER:* | Two fundamental phenomena indicate that the Big Bang occurred: (1) the universe is expanding, and (2) it is permeated by background radiation. | |

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| 55. What are Earth’s six principal subsystems?   |  |  | | --- | --- | | *ANSWER:* | The principal subsystems of Earth are: - atmosphere - biosphere - hydrosphere - lithosphere - mantle - core | |

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| 56. Describe the steps involved in the scientific method.   |  |  | | --- | --- | | *ANSWER:* | The scientific method is an orderly, logical approach that involves gathering and analyzing facts or data about the problem under consideration. Tentative explanations, or hypotheses, are then formulated to explain the observed phenomena. Next, the hypotheses are tested to see whether what was predicted actually occurs in a given situation. Finally, if one of the hypotheses is found, after repeated tests, to explain the phenomena, then the hypothesis is proposed as a theory. A theory is subject to further testing and refinement as new data become available. | |

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| 57. Provide a brief overview of the solar nebula theory.   |  |  | | --- | --- | | *ANSWER:* | According to the currently accepted solar nebula theory for the origin of our solar system, the planets and the Sun formed from a rotating cloud of gas. About 90% of the material was concentrated in the central part of the disk, thus forming an embryonic Sun, around which swirled a rotating cloud of material called a *solar nebula*. Within this solar nebula were localized eddies in which gases and solid particles condensed. During the condensation process, gaseous, liquid, and solid particles began to accrete into ever-larger masses called *planetesimals*, which collided and grew in size and mass until they eventually became planets. | |

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| 58. Explain the connection between the rock cycle and plate tectonics.   |  |  | | --- | --- | | *ANSWER:* | The connection between the rock cycle and plate tectonics is just one of many examples of how Earth’s various subsystems and cycles are interrelated. Heating within Earth’s interior results in convection cells that power the movement of plates and magma, which forms intrusive and extrusive igneous rocks. Movement along plate boundaries may result in volcanic activity, earthquakes, and, in some cases, mountain building. The interaction among the atmosphere, hydrosphere, and biosphere contributes to the weathering of rocks exposed on Earth’s surface. Plates descending into Earth’s interior are subjected to increasing heat and pressure, which may lead to metamorphism, as well as the generation of magma and yet another recycling of materials. | |