Earth Science Reference Tables Review

For the following questions use the *Earth Science Reference Tables*. Record your answers on the separate answer sheet that is provided.

1. Which Earth material has the highest specific heat?

2. Which of the following materials will require the *least* amount of heat to raise its temperature from 20°C to 15°C? (basalt, ice, lead, or granite)

3. Which phase change of water requires the addition of the greatest amount of heat? (melting, freezing, vaporization, or condensation)

4. At what temperature is water’s density 1.00 gram/milliliter.

5. Which radioactive isotope has a half-life of 1,300,000,000 years?

6. Lead-206 is the daughter isotope for which radioactive isotope?

7. A fossil bone contains C¹⁴ and N¹⁴ in the ratio of 1:3. How old is the bone?

8. What is the percentage, by volume, of oxygen in Earth’s crust?

9. A portion of a topographic map is shown below. Determine the gradient between points C and D on the map. Round to the nearest tenth. (The elevations shown by contour lines are in meters above sea level.)

![Topographic Map](image)

 SCALE: 1 cm = 0.5 km
10. A stream transports a sand grain 400 centimeters in 10 seconds. Calculate the rate at which the sand grain moved along the stream bed.

11. A mineral with a density of 2.7 g/cm³ has a volume of 120 cm³. What is the mineral’s mass?

12. Most of the bedrock exposed on the Allegheny Plateau was formed during which geologic time period?

13. In which of the following landscape regions would the oldest bedrock be found?
   (1) Erie-Ontario Lowlands  (3) Tug Hill Plateau
   (2) Atlantic Coastal Plain  (4) Adirondack Mountains

14. Would limestone and chemically formed sedimentary rocks be found in the Newark Lowlands?

15. Which landscape region separates the Adirondack Mountains from The Catskills?

16. Which landscape region is composed primarily of Cretaceous through Pleistocene weakly consolidated gravels, sands, and clays?

17. What landscape region is located at 42° 15’ N, 74° 30’ W?

18. At which location could rocks that are 1,200,000,000 years old be found? (Old Forge, Rochester, Kingston, or Massena)

19. What is the difference in surface elevation between Lake Ontario and Lake Erie?

20. The rocks of the Adirondack Mountains resulted from this type of metamorphism.

21. What warm ocean current flows northward along the east coast of the United States?

22. Cool ocean currents flow towards (higher, lower) latitudes?

23. The Mid-Atlantic Ridge is what type of plate boundary?

24. The convergence of two ocean plates is found at the
   (1) Peru-Chile Trench  (3) Aleutian Trench
   (2) Southeast Indian Ridge  (4) Southeast-Indian Ridge

25. A subduction zone is associated with what type of plate boundary?

26. What type of plate boundary is found at 0°, 80° W?

27. Which Northern Hemisphere hot spots are found at about the same longitude?

28. What is the grain size of a fine-grained igneous rock?

29. Name four coarse-grained igneous rocks that contain no quartz.
30. Which felsic igneous rocks have a vesicular texture are not composed of minerals?

31. A volcanic igneous rock that contains potassium feldspar and has a vesicular texture is:

32. An igneous rock with approximately 70% pyroxene would contain approximately what percent plagioclase feldspar?

33. What mafic rock is composed of 100% olivine?

34. What is the primary difference between gabbro and basalt?

35. Which statement is supported by the Rock Cycle?
   (1) Metamorphic rock often forms from older rocks being subjected to heat and/or pressure.
   (2) Sedimentary rock can only be formed from igneous rock.
   (3) All sediments are lithified directly into sedimentary rock.
   (4) Igneous rock never results from melting of older rock and solidification of magma.

36. Sediments form as the result of what processes?

37. What is the size range for a pebble?

38. What is the diameter of the largest sized particle a stream could transport if its water velocity is 30 cm/s?

39. Which sedimentary rock is composed of cemented shells, shell fragments or precipitates of biologic origin?

40. Which clastic sedimentary rock contains the greatest range of particle sizes?

41. Which sedimentary rock is formed from compacted clay particles?

42. Which sedimentary rock can be identified by the acid test?

43. The symbol below represents which rock?

![Symbol Image]

44. Which foliated metamorphic rock results from high-grade metamorphism?

45. Marble forms from the metamorphism of what rock?

46. Which rock forms as a result of only contact metamorphism?

47. Geologic time is subdivided into a number of time units called periods on the basis of
   1) rock thickness
   2) fossil evidence
   3) rock types
   4) radioactive dating of rocks
48. The Permian Period began how many million years before the present?

49. Which of the following fossils could be found Middle Proterozoic Era in rocks?
   1) coelophysis  
   2) graptolite  
   3) eurypterid  
   4) stromatolites

50. Most of the bedrock found in New York State formed during which era?
   1) Cenozoic  
   2) Mesozoic  
   3) Paleozoic  
   4) Early Proterozoic

51. What important geologic event occurred in NY State during the Late Proterozoic Period between 580 million and 542 million years ago??
   1) Grenville Orogeny  
   2) Rifting and initial opening of Iapetus Ocean  
   3) Collision of North America and Africa  
   4) Erosion of Grenville Mountains

52. Which orogeny resulted from the collision of North America and Avalon during the Devonian Period?

53. During which period did North America separate from Africa causing the initial opening of the Atlantic Ocean?

54. During this period Pangaea formed as a result of the collision of North America and Africa.
   1) Paleozoic  
   2) Permian  
   3) Early Permian  
   4) Phanerozoic

55. Which eurypterid species existed during only the Silurian Period?

56. Which subdivision of geologic time covers the shortest amount of time? (eon, era, period, epoch)

57. The Paleozoic Era lasted for how many years? (Express your answer in scientific notation.)

58. What events marked the end of the Paleozoic and Mesozoic eras?

59. Fossils of the earliest fishes are found during which epoch?

60. Oceanic oxygen began to enter the atmosphere during which era?

61. A rock containing fossils of Cryptolithus and Valcouroceras, formed during which epoch?

62. A rock containing the bones of Coelophysis would be dated from which epoch?

63. What sedimentary rock could be formed from fossils of Lichenaria?

64. This period began 359 million years ago and is divided into two different periods in North America due to the presence of a widespread unconformity.

65. What is the interior temperature at the boundary between Earth’s mantle and the outer core?
66. What is the pressure at a depth of 5,000 km below Earth’s surface?

67. Which of Earth’s interior zones is inferred to be completely liquid?

68. What term is used for the boundary between the mantle and the crust?

69. Which is denser, continental crust or oceanic crust?

70. Together, the crust and rigid mantle are part of the:

71. As depth increases, density: (decreases, increases, remains the same)

72. What feature is found on the seafloor offshore near the Cascades?

73. In which zone of Earth’s interior is the density 11.0 grams/cm³?

74. What mineral would be found in the rocks found at a depth of 400 km?
   (1) quartz  (3) calcite
   (2) orthoclase feldspar  (4) olivine

75. In Earth’s crust, what two elements are most abundant by mass?

76. What is the percent (by volume) of oxygen in the troposphere?

77. What is the distance to the epicenter of an earthquake if the arrival time of the P-wave is 10:12:00 and the arrival time of the S-wave is 10:15:40?

78. If the P-wave from an earthquake whose epicenter was 5,000 km from the seismograph station arrived at 21:10:00, what time did the S-wave arrive?

79. A seismograph 5,600 km from an earthquake’s epicenter recorded the first arrival P-wave at 08:11:00. What was the origin time of the earthquake?

80. Which seismic wave travels at the fastest rate, the P-wave or the S-wave?

81. Find the relative humidity if the dry-bulb temperature is 14° C and the wet-bulb temperature is 8° C.

82. Find the dewpoint temperature if the dry-bulb temperature is 20° C and the wet-bulb temperature is 19° C.

83. As the difference between the dry-bulb and the wet-bulb temperatures of a sling psychrometer increases, the relative humidity (decreases, increases, remains the same).

84. On a weather map, an air mass that is very warm and dry would be indicated by what abbreviation?

85. Draw the symbol used on a weather map for a cold front. Draw an arrow through the front that shows which way the front would be moving.

86. Convert 86° F to its equivalent temperature in degrees Celsius.

87. Convert 0° C to its equivalent temperature in degrees Fahrenheit.
Based on the station model shown below, identify the weather variables indicated.

88. Temperature
89. Barometric pressure (convert to long form)
90. Barometric pressure three hours ago based on the barometric trend
91. Wind direction
92. Wind speed
93. Dewpoint temperature
94. Cloud cover
95. Present weather

96. Find the relative humidity if the air temperature is 68°F and the dewpoint temperature is 52°F
97. Convert an air pressure of 996.0 mb to its equivalent in inches of mercury (Hg).
98. Convert an air pressure of 29.10 inches of Hg to its equivalent in millibars.
99. The greatest concentration of water vapor is present in which temperature zone of the atmosphere?
100. What change in atmospheric pressure occurs with increasing altitude?
101. What is the temperature in degrees Celsius at the tropopause?
102. The stratopause is found at an altitude of approximately how many miles?
103. As a rocket passes through the mesopause, it enters which temperature zone of the atmosphere?
104. In which two temperature zones of Earth’s atmosphere does temperature increase as altitude increases?
105. Which visible wavelength of the electromagnetic spectrum has the shortest wavelength?
106. Which electromagnetic wave is radiated by Earth’s surface and warms the air in the Troposphere?
107. Which electromagnetic wave is absorbed by ozone in the upper stratosphere?
108. At which latitudes do surface winds converge?
109. Between 30° N and 60° N planetary winds are generally from which compass direction?
110. In the northern hemisphere, the Coriolis Effect appears to deflect wind in which direction (the right or the left) of the direction of travel?
111. What vertical motion of air is responsible for the dry conditions found at 30° N and 30° S?

112. Which star appears about 100 times brighter than the Sun?

113. Compared to Alpha Centauri, Rigel is
   (1) less massive and hotter
   (2) more massive and cooler
   (3) the same mass and hotter
   (4) more massive and hotter

114. What color stars are the hottest?

115. Which of the following stars is most massive, Sirius, Barnard’s Star, Betelgeuse, or Procyon B?

116. At the end of its life cycle in about 4.5 billion years, the Sun will be most similar to which star?

117. Which planet takes the longest to travel once around the Sun along its orbit?

118. Which planet's period of rotation is closest to Earth's period of rotation?

119. What is the eccentricity of the orbit of Mars?

120. The shape of which planet's orbit is most eccentric?

121. Which planet’s orbit has an eccentricity closest to that of a circle?

122. What is Saturn’s mean distance from the Sun?

123. Which object in the Solar System has a period of revolution that is almost identical to its period of rotation?

124. How many times greater is Earth’s equatorial diameter than the Sun’s equatorial diameter?

125. Determine the eccentricity of the ellipse shown below. (Round your answer to the nearest thousandth.)
126. Name a nonmetallic mineral that will not scratch glass and cleaves in 4 directions.

127. What mineral is easily scratched by a fingernail and is used in the making of plaster of paris and drywall?

128. What mineral has a chemical formula of FeS₂?

129. Name two minerals that are not compounds.

130. Which mineral is often seen as red glassy grains in New York State metamorphic rocks?

131. What is the chemical symbol for magnesium?

132. In which NY State landscape region are gneisses, quartzites, and marbles of Middle Proterozoic Eon age found?

133. What type of boundary is found between the North American Plate and the Caribbean Plate?

134. On which continent is a rift zone found?

135. What metamorphic rock forms from the regional metamorphism of bituminous coal?

136. What is the significance of the Ediacaran fauna?

137. Sediments from these two periods are found in NY State.

138. Oceanic oxygen began to enter the atmosphere during this era.

139. This term is used for forces and events leading to deformation of Earth’s crust and the formation of mountains. In NY state four of these events occurred between the Middle Proterozoic Era and the Permian Period.

140. Which fossil group found in New York State has the longest range of existence?

141. What two elements are found in Earth’s core?

142. What is the mean distance of Earth’s Moon from Earth?

143. Which celestial object in the Solar System has the same period of revolution as its period of rotation?

144. What is the luminosity of the star Polaris?

145. A star in this stage of its life cycle is cool and dim.
### Answer Sheet: Earth Science Reference Tables Review

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