Station 1

1. This sample contains multiple minerals. The focus of these questions will be concerning the **green crystals** found on the one end. Identify this green mineral, as named on the official Rocks & Minerals List.

2. Write the chemical formula for this mineral.

3. The Mohs hardness scale defines the hardness of this mineral as:

A. 9 B. 4.5 – 5 C. 7 D. 7.5 – 8 E. 6

4. What is the mineral name for the PINK variety of this mineral?

5. What would be the streak color for any variety of this mineral?

A. white B. yellow C. deep red
D. green E. pink F. deep gray

6. This mineral is used in the gem industry. However, it is also sought after as an ore for what element?

Station 2

7. Identify the Mineral as named on the official Rocks & Minerals List.

8. Write the chemical formula for this mineral.

9. As very well evidenced by this sample, the cleavage of this mineral is:

A. obtrusive B. perfect basal C. hexagonal
D. distinct E. perfect rhombohedral

10. The specific gravity of this mineral is:

A. 2.7 B. 3.3 C. 3.8
D. 4.1 E. 4.7 F. 5.3

11. Name the allotrope of this mineral which also appears on the official Rocks & Minerals List.

12. This mineral is the primary component of which two rocks?

A. granite and diorite
B. granite and gabbro
C. limestone and marble
D. marble and gabbro
E. limestone and diorite
F. marble and diorite

Station 3

13. Identify this rock type as named on the official Rock & Mineral List.

14. Classify this as an igneous, metamorphic, or sedimentary rock.

15. This rock contains many "pits" or "holes". What is the geological term for this property? **(1st tiebreaker)**

16. The formation of the "pits" in this rock involves:

A. erupted magma dissolving highly soluble minerals it encounters at the surface.

B. rising magma reaching lower pressures, causing dissolved gases to come out of solution.

C. erupted magma encountering water which instantly vaporizes.

D. liquid iron being pulled from magma due to magnetic materials.

E. acidic runoff flowing through the formed rock, dissolving carbonates within.

17. This type of rock has multiple industry uses including:

I. High temperature insulation

II. Increased traction on icy roads

III. Cosmetic pigment additive when pulverized

A. I only	B. II only	C. III only
D. I and II only	E. I and III only	F. II and III only

18. The specific gravity of this rock varies, but is always greater than what value, as evidenced by the fact that it will sink in water.

Station 4

19. Identify this rock as it is named on the official Rocks & Minerals List.

20. By mass, what is the highest percent elemental component of this rock?

21. Identify this rock as igneous, metamorphic, or sedimentary.

22. This rock forms after going through several stages. What rock was it (also on the official Rocks & Minerals List) during the stage that is prior to the stage it is currently in?

23. This rock has a primary use, but some of the other minor uses include:

I. solid lubricant II. jewelry III. flame retardant

A. I only B. II only C. III only
D. I and II only E. II and III only F. I, II, and III

24. What is the fracture of this type of rock?

Station 5

25. Identify the Mineral as named on the official Rocks & Minerals list.

26. Write the chemical formula for this Mineral.

27. This Mineral comes in multiple varieties. What is the common name (two words) for the variety that this sample represents?

28. The industrial uses for this Mineral include:

I. Medical Radiology II. Pharmaceuticals III. Paint Pigment

A. I only B. II only C. III only
D. I and II only E. I and III only F. II and III only

29. In the crystalline variety of this mineral, what is the crystal system?

A. monoclinic B. hexagonal C. triclinic
D. tetragonal E. orthorhombic F. cubic

30. If placed in hydrochloric acid, this Mineral would:

A. Turn green
B. Vigorously bubble and turn green
C. Vigorously bubble
D. Dissolve quickly
E. Dissolve slowly
F. Nothing

Station 6

31. Identify this Mineral, as named on the official Rocks & Minerals list

32. What is the common name given to masses of this mineral and others which have a soapy, greasy feel?

33. What is the hardness of this mineral as defined on the Mohs hardness scale? **(2nd tiebreaker)**

34. This mineral sometimes has a light green hue to it due to the presence of trace amounts of which element?

35. This mineral typically occurs in _____-rich rocks that are affected by low-grade metamorphism.

A. Barium	B. Magnesium	C. Copper
D. Calcium	E. Iron	F. Sulfur

36. What is the crystal system of this Mineral?

A. Monoclinic	B. Orthrhombic	C. Amorphous
D. Hexagonal	E. Tetragonal	F. Trigonal

Station 7

37. Identify the Mineral as named on the official Rocks & Minerals list.

38. Write the chemical formula for this Mineral

39. The streak of this mineral is:

A. deep gray	B. pale blue	C. lime green
D. tan/brown	E. white	F. pale pink

40. After being heat-treated, this mineral will exhibit fluorescence under UV light. The color it will fluoresce is:

A. yellow	B. violet	C. blue
D. green	E. pink	F. orange

41. If this mineral is ground up into a powder and a flame test were performed on it, what color would the flame be? **(3rd tiebreaker)**

A. red	B. pink/violet	C. white
D. blue/green	E. green/yellow	F. orange

42. This mineral is an ore source for a metal which is used in which of the following industries?

I. cosmetic/ointment II. fireworks III. tool manufacturing

A. I only	B. II only	C. III only
D. I and II only	E. II and III only	F. I, II, and III

Station 8

Note: While the fossil is cool, it is the ROCK that it is in that these questions focus on!

43. Identify the Rock as named on the official Rocks & Minerals list.

44. A variety of this rock is used as a fossil fuel. What is the common name of this variety?

45. Classify this rock as igneous, metamorphic, or sedimentary.

46. This type of rock has a tendency to split easily into thin layers. What is the lapidary term for this property?

47. The black variety of this type of rock is dark in color due to the presence of unoxidized _____.

A. Iron B. Silicon C. Carbon
D. Calcium E. Sulfur F. Bismuth

48. If this type of rock is subjected to heat and pressure, it will transform to which type of rock, also listed on the official Rocks & Minerals list?

Station 9

49. Identify the Mineral that these samples are an example of, as named on the official Rocks & Minerals list.

50. What metal is this mineral an ore of?

51. Though indicated as a "Mineral" on the official Rocks & Minerals list, this is actually a mixture of multiple minerals including:

I. gibbsite II. boehmite III. diaspore

A. I and II only B. II and III only C. I and III only
D. I, II, and III

52. The specific gravity of this mineral is what range?

A. 1.1 – 1.3 B. 1.4 – 1.8 C. 1.8 – 2.0
D. 2.3 – 2.7 E. 2.8 – 3.0 F. 3.0 – 3.1

53. When this mineral is dissolved in molten cryolite and electrolyzed with direct current, the molten metal that this mineral is an ore of is released. This process was discovered by two men, independently, in 1886, and is now named after them. What is the name of this process? **(4th tiebreaker)**

54. Which of the following countries is the world's largest source of this mineral?

A. Jamaica B. Germany C. New Guinea
D. Canada E. France F. Australia

Station 10

55. Identify the Mineral as named on the Official Rocks & Minerals list.

56. To which mineral group does this Mineral belong? **(5th tiebreaker)**

57. The refractive index of the crystals of this mineral is measured as:

A. 1.63 B. 1.70 C. 1.75
D. 1.52 E. 1.54 F. 1.58

58. If placed in hydrochloric acid, this mineral would:

A. do nothing
B. vigorously bubble
C. fully dissolve
D. break up into insoluble fragments

59. The carbonate hydroxyl variety of this mineral is the principle component of:

A. satellite lens coatings
B. human bones
C. commercial solid lubricants
D. drywall
E. chemical fertilizer

60. What element is commercially extracted from this mineral and used in the heads of matches?

Station 11

61. Identify Mineral A (including which variety) as named on your Official Rocks & Minerals list.

62. Identify Mineral B (including which variety) as named on your Official Rocks & Minerals list.

63. Both minerals have the same chemical formula. Write this chemical formula.

64. Mineral B gains its yellow/orange color due to trace amounts of what element within the crystal?

65. If Mineral A is subjected to _____, it will become identical in appearance to Mineral B.

A. high pressures
B. sulfuric acid
C. high temperatures
D. strong magnetic fields
E. chemical leeching reagents

66. Mineral A was thought by the Ancient Greeks to prevent which of the following:

A. pregnancy
B. war
C. forgetfulness
D. food from spoiling
E. drunkenness
F. death

Station 12

67. Identify the Mineral as named on the official Rocks & Minerals list.

68. Write the chemical formula for this Mineral.

69. In ancient times, this mineral would be ground up, pulverized, and mixed with animal lard in order to produce some of histories first:

I. cosmetics II. healing salves III. paint pigment

A. I only B. II only C. III only
D. I and II only E. I and III only F. II and III only

70. This sample is a "massive" habit of this mineral. Another type of habit exists for this mineral. What is it?

71. When pulverized and mixed with a carbon source, ancients found that strong heating of this mineral would produce pure _____. Another product of this reaction is _____.

A. tin, carbon dioxide
B. tin, oxygen
C. copper, carbon dioxide
D. copper, oxygen
E. iron, carbon dioxide

72. If placed in hydrochloric acid, this mineral would:

A. do nothing
B. dissolve, producing a blue solution
C. dissolve, producing a green solution
D. dissolve, producing a blue solution and bubbles
E. dissolve, producing a green solution and bubbles

Station 13

73. Identify the Sedimentary Rock that this sample is an example of, as named on the official Rocks & Minerals list.

74. This Rock derives its name from a word that reflects how it is formed. The formation of this Rock involves
    A. marine algae deposits
    B. fragmented gypsum
    C. volcanic ash
    D. extremely basic (caustic) river run offs
    E. crushed vertebrate skeletons

75. The high purity and fine grain of this Rock makes it ideal for use as:
    A. a chemical source of calcium
    B. a filtration material
    C. an artistic carving medium
    D. white pigment used in paints
    E. flux material ingredient for welding.

76. Name the class that this Sedimentary Rock is a member of.

77. Write the common "nickname" for this Rock.

78. This Rock is used in the insecticide industry as:
    A. a toxic material added to insect bait
    B. a chemical repellent due to its odor
    C. a chemical that can confuse insect chemical signals
    D. an absorber of insect lipids through exoskeletons
    E. a powder which when present in hives, sterilizes eggs

Station 14

79. Identify the Mineral as named on the official Rocks & Minerals list.

80. What would be the color of streak left by this mineral? **(6th tiebreaker)**

81. If this material absorbs water and becomes a hydrate, what is the common name for the chemical that would be formed?

82. The specimen shown here shows the platy form/habit of crystals. What other form(s) exist(s)?

I. botryoidal II. tabular III. pseudocubic

A. I only B. II only C. I and II only
D. II and III only E. I and III only F. I, II, and III

83. The world's largest producing source of hematite is off the shore lines of what Great Lake?

A. Michigan B. Superior C. Erie
D. Huron E. Ontario

84. What is the oxidation state of the metal in this mineral?

Station 15

85. Identify this Mineral (including which variety) as named on the official Rocks and Minerals list.

86. The name of the variety of this mineral is derived from what astronomical body?

87. How many molecules of water are associated with each formula unit in this mineral's crystal lattice?

A. zero B. 2 C. 5 D. 7 E. 9 F. 10

88. What is the specific gravity of this mineral? You must report this value to the tenths place.

89. Within the Naica mine, in 2000 a new cavern was discovered containing crystals of this mineral over 2m long, being the largest crystals of this variety discovered to date. In what country does this mine reside?

90. A very unusual property that these crystals have that most other ionic compound minerals do not exhibit is that they

A. can be slightly bent into new angles that hold their place
B. will not refract ultraviolet light waves
C. can be dissolved by non-polar solvents
D. change color when heated, changing back when cooled
E. can easily conduct electricity
F. produce a variety of streak colors depending upon the pressure applied

Station 16

91. Identify the Metamorphic Rock this sample represents, as named on the official Rocks & Minerals list.

92. The most common precious stone found associated with this Metamorphic Rock is:

A. diamond B. emerald C. ruby
D. almandine E. topaz F. sapphire

93. In the building industry, this Metamorphic Rock is wrongly classified as what Igneous Rock, also listed on the official Rocks and Minerals list?

94. In this Metamorphic Rock, the white bands are formed from _____ minerals, while the dark bands are formed from _____ minerals.

A. felsic, mafic B. mafic, felsic C. felsic, caustic
D. caustic, felsic E. caustic, mafic F. mafic, caustic

95. This type of Rock may be the Earth's toughest, most durable. The oldest known rock on Earth is of this variety, dated to 3.9 billion years old. What country is this rock located in?

96. The minerals that make up this Metamorphic Rock, in order of their most often abundance within the rock are:

A. mica, quartz, feldspar B. quartz, mica, feldspar
C. quartz, feldspar, mica D. mica, feldspar, quartz
E. feldspar, mica, quartz F. feldspar, quartz, mica

Station 17

97. This sample has thin quartz crystals jutting out of a matrix of **another** mineral. It is this other, dark mineral that these questions focus upon. Identify the Mineral that this sample is an example of, as named on the official Rocks & Minerals list.

98. This mineral has a variety of colors and can be fairly translucent (unlike this sample). This dark, opaque version, however, has been historically easily mistaken for what other mineral (also on the official Rocks and Minerals list) which forms in the same locations and conditions?

99. Referring to the idea of the easily mistaken other mineral, the easiest way to tell the difference between the two is with a streak test. The streak that results for this mineral sample is best described as:

A. dark red	B. gray/blue	C. soot black
D. rusty	E. blue/grean	F. yellow/brown

100. This dark, opaque variety of the Mineral is known by a nickname. What is the nickname for this dark variety?

101. Write the chemical formula for this Mineral.

102. The dark, opaque variety shown here is dark in color due to the presence of amounts of what metal, locked within the crystal lattice?

Station 18

103. Mineral A and Mineral B are examples of the same Mineral, and the same variety. Identify this Mineral, as named on the official Rocks and Minerals list.

104. There are many varieties of this mineral, with many different chemical compositions. However, they all form crystals with nearly the same physical properties. What is the cleavage of this Mineral considered to be?

A. perfect B. distinct C. indistinct
D. basal E. imperfect

105. What is the name of the variety which is both green and pink in color?

106. The luster of all varieties is considered to be:

A. vitreous B. adamantine C. resinous
D. pearly E. greasy F. dull

107. What is the name of this black variety of this Mineral?

108. What is the name of the variety which is used most often in the gem industry and also comes in a variety of colors with great translucent properties?