

EOSC 118 Questions – Module A: Diamonds and due diligence (15%)

1. The GIA stands for _____.

- A. Gemological Institute of Africa
- B. Garnet Infused Aquamarine
- C. Geological Institute of America
- D. Gem Industry Associates
- E. Gemological Institute of America

2. "Historic Stones" are usually _____.

- A. of fine quality and a rare gem species
- B. very well cut
- C. traceable to before 1000 AD
- D. of fine quality, of large size, and have a notable story
- E. of large size and in the British Crown Jewels

3. Which of the following is NOT TRUE about the Cullinan Diamonds?

- A. They reside in the British Royal Family's Crown Jewels.
- B. The original rough diamond was found at the Premier Mine, South Africa.
- C. There are nine significant Cullinan Diamonds.
- D. They all originate from the same 3,106 carat rough diamond.
- E. The largest Cullinan Diamond is the largest faceted diamond in the world.

4. Tiffany & Co. is _____.

- A. a luxury brand founded in New York
- B. a luxury brand founded in Paris
- C. the company that held much of the diamond monopoly until the mid 1980's
- D. a group devoted to active mining in Africa
- E. an association of independent jewellers and gemologists

5. Which of the following describe a mineral by definition?

- A. crystalline
- B. naturally occurring
- C. definite chemical composition
- D. not lab-grown
- E. All

6. High-end jewellery is commonly loaned to famous people _____.

- A. as a marketing tool for the designer
- B. since it is unfashionable to not wear expensive jewellery
- C. because they trade between their friends
- D. as a favour from the designer
- E. before they buy it

7. The Periodic Table _____.

- A. is an organized collection of variables that define the value of gems
- B. is an organized collection of the known elements from which information can be extracted
- C. groups elements based on the number of neutrons
- D. describes the many minerals of the Earth
- E. describes the valence state of atoms

8. The finest ruby colour is _____.

- A. Burgandy
- B. Cherry Red
- C. Bright Pink
- D. Pigeon's Blood Red
- E. Cornflower Blue

9. A positively charged atom is called _____.

- A. an electron
- B. an anion
- C. a mixture
- D. a cation
- E. a compound

10. Where do some of the earliest diamonds originate from?

- A. India
- B. Australia
- C. Russia
- D. Canada
- E. Cambodia

11. The P-T stability field for diamond is sometimes called _____.

- A. Craton Door
- B. The Kim Zone
- C. La Ventana
- D. The Diamond Window
- E. Diamond Pavillion

12. Which of the following province/state does NOT (yet) have any diamond occurrences?

- A. Nunavut
- B. BC
- C. PEI
- D. Quebec
- E. Sask

13. What crystal system does diamond belong to?

- A. orthorhombic
- B. trigonal
- C. isometric
- D. hexagonal
- E. tetragonal

14. What shape does euhedral diamond usually exhibit?

- A. tetrahedron
- B. spheroid
- C. octahedron
- D. none
- E. rectangular prism

15. The round brilliant cut was designed to _____.

- A. maximize the carat weight of a rough diamond
- B. improve clarity
- C. return as much possible light back through the table
- D. intensify faint colours
- E. mask colour in stones with colour poorer than J

16. Which one of the following does NOT OFFICIALLY belong in the 4Cs of diamond grading?

- A. Colour
- B. Clarity
- C. Carat
- D. Cut
- E. **Country**

17. The Canadian Diamond Rush started in _____.

- A. the early 1990's
- B. 2008
- C. early 20th century
- D. **the late 1970's**
- E. very early in the 21st century

18. Which of the following best describes the chemical formula of diamond?

- A. moissanite
- B. carbon oxide
- C. titanium chromium oxide
- D. **carbon polymorph**
- E. boron nitride

19. What is the Mohs hardness of diamond?

- A. **10**
- B. 9.5
- C. 9
- D. 8
- E. 7.5

20. Which of the following statements is FALSE?

- A. Gemstones are highly valued.
- B. All minerals are crystals.
- C. Rocks are composed of minerals.
- D. **All gems are minerals.**
- E. Not all crystals are gems.

21. Each element has a unique number of _____.

- A. neutrons
- B. neutrons, protons, and electrons
- C. neutrons and protons
- D. electrons
- E. **protons**

22. All crystals are "charge neutral".

True

23. Which of the following is/are NOT TRUE about chemical formulas for minerals?

- A. **They tell you all you need to know about minerals.**
- B. They can be systematically decoded.
- C. They use element abbreviations for simplification.
- D. They are composed only of elements.
- E. They contain abundant useful information.

24. The CanadaMark _____.

- A. certifies jewellery as having a Canadian origin
- B. certifies gold as having a Canadian origin
- C. certifies a diamond as having a Canadian origin
- D. certifies a gemstone as having a Canadian origin
- E. certifies gold as having a 24K purity

25. Trace elements are more abundant than minor elements.

False

26. A positively charged atom is called _____.

- A. an anion
- B. an electron
- C. a compound
- D. a mixture
- E. a cation

27. The term "Karat" refers to _____.

- A. the weight of diamond
- B. the weight of gold
- C. the purity of silver
- D. the purity of diamond
- E. the purity of gold

28. Bonding _____.

- A. is not present in gemstones or precious metals
- B. is the glue that holds matter together
- C. is the fourth element of the Periodic Table
- D. is a unit of measurement for precious metals
- E. is a state of matter

29. Of the historic diamonds belonging to royal families described in the notes, which one was sold at an auction?

- A. Wittlesbach Diamond
- B. Cullinan Diamond
- C. Centenary Diamond
- D. Koh-i-Noor Diamond

30. What percentage of diamonds are of good enough size and quality to be cut and polished?

- A. 50%
- B. 20%
- C. 75%
- D. 100%

31. Which of the following famous diamonds was recut to improve its brilliance and how many carats were lost approximately during the process?

- A. Cullinan, ~50
- B. Cullinan, ~90
- C. Koh-i-Noor, ~20
- D. Koh-i-Noor, ~90

32. Gold is rarer than PGMs

False

33. Which famous Colombian emerald was carved in India at the end of the 17th century?
- A. Hooker Emerald
 - B. **Mogul Emerald**
 - C. Incomparable Emerald
 - D. Patricia Emerald
34. Mid-oceanic ridges form at _____:
- A. convergent plate boundaries
 - B. **divergent plate boundaries**
 - C. mantle plumes
 - D. both a+b
35. The identity of an atom is determined by the number of _____:
- A. electrons
 - B. neutrons
 - C. **protons**
36. If two minerals have the same colour and luster, what are other physical properties that you could test without damaging (not scratching) the mineral?
- A. Specific gravity
 - B. Refractive index
 - C. Fluorescence
 - D. Hardness
 - E. **Specific Gravity, Refractive Index and Fluorescence**
37. An ion refers to a charged atom which _____:
- A. gains or loses protons
 - B. **gains or loses electrons**
 - C. gains or loses neutrons
38. The atomic mass of an atom refers to the number of _____:
- A. **protons and neutrons**
 - B. electrons and neutrons
 - C. protons and electrons
39. A four-sided polyhedron is called a _____.
- A. Icosahedron
 - B. **Tetrahedron**
 - C. Octahedron
 - D. Square
 - E. Cube
40. Which group consumes the most gold annually?
- A. Financial Institutions
 - B. **Jewellery Industry**
 - C. Government Stockpiles
 - D. Private Investors
 - E. Electronics Industry
41. The two main divisions of igneous rocks are _____.
- A. **intrusive and extrusive**
 - B. volcanic and sedimentary
 - C. mafic and felsic
 - D. granitic and dioritic
 - E. regional and contact

42. Emeralds are _____ and rubies are _____.
- A. red ... green
 - B. green ... red
 - C. colourless ... blue
 - D. blue ... red
 - E. green ... blue
43. Which of the following statement is TRUE for diamond clarity grading?
- A. VS2 > I1
 - B. I3 > I1
 - C. VVS2 < VS1
 - D. VS2 > VVS2
 - E. IF < I2
44. The classical shape of a kimberlite pipe is similar to a _____.
- A. pyramid
 - B. sheet of paper
 - C. muffin
 - D. carrot
 - E. tree
45. Of these colours, which is the least common for natural diamond?
- A. brown
 - B. blue
 - C. yellow
 - D. colourless
 - E. green
46. Which of the following is a method for producing synthetic diamonds?
- A. lamprophyre
 - B. kimberlite
 - C. CVD
 - D. hydrothermal solution
 - E. flame fusion
47. Which of the following parts of a cut diamond is NOT always present on a modern cut diamond?
- A. crown
 - B. culet
 - C. table
 - D. girdle
 - E. pavilion
48. Historically, which country has produce the most gold annually?
- A. China
 - B. USA
 - C. Australia
 - D. South Africa
 - E. Canada
49. Sedimentary rocks are derived _____.
- A. melting of other rocks
 - B. from subjecting intense pressure to other rocks
 - C. from volcanoes
 - D. only from water-transported grains
 - E. from weathering of other rocks

50. What non-destructive physical property is most commonly tested for to identify diamond?
- A. electrical conductivity
 - B. **thermal conductivity**
 - C. hardness
 - D. fluorescence
 - E. colour
51. The Kimberley Process _____.
- A. was developed in response to the movie "Blood Diamond"
 - B. further regulates the diamond trade for profits
 - C. **was designed to reduce the exploitation of illicit diamonds**
 - D. was designed to ensure perfectly cut round brilliant diamonds
 - E. is used to detect rough diamonds on the conveyor belt during kimberlite mining
52. Recent consumer trends in the jewellery industry include _____.
- A. copper jewellery
 - B. diamond and yellow gold
 - C. boutique jewellery stores
 - D. topaz and white gold
 - E. **conflict-free jewellery**
53. Subduction zones can be described as _____.
- A. **tectonic boundaries where one plate moves beneath another**
 - B. tectonic boundaries where two plates are diverging from one another
 - C. the boundary between the atmosphere and the lithosphere
 - D. tectonic boundaries where one plate slides past another
 - E. the boundary between the core and lower mantle
54. The largest cut diamond weighs 545 carats and is called _____.
- A. Centenary
 - B. Incomparable
 - C. **Golden Jubilee**
 - D. Millennium Star
 - E. Cullinan I
55. Which of the following minerals can scratch diamond?
- A. **diamond**
 - B. corundum
 - C. beryl
 - D. forsterite
56. Diamonds crystallize in the magma that brings them to the surface
False
57. Which is the most important property of diamonds that helps to distinguish it from imitations?
- A. electrical conductivity
 - B. refractive index
 - C. dispersion
 - D. **thermal conductivity**
58. Ideally, what element(s) comprise(s) diamond?
- A. Only O and C
 - B. **Only C**
 - C. C and Cl
 - D. Au and D

59. If the density of diamond is 3.51 g/cm³ and the density of graphite is 2.20 g/cm³, what does this say about the crystal structure of the 2 minerals if their composition is the same?

- A. The atoms in diamond are packed closer together than in graphite
- B. The atoms in diamond are further apart than in graphite
- C. The atoms in diamond and graphite are arranged the same way

60. What is the common form of euhedral beryl crystals?

- A. hexagonal prism terminating with a point
- B. octahedron
- C. water-worn pebbles
- D. hexagonal prism with flat termination
- E. parallelogram

61. Diamonds are formed in which part of the earth?

- A. Crust
- B. Mantle
- C. Core

62. The 4-C's stand for:

- A. Composition, clarity, colour, carat
- B. Composition, conductivity, cut, cleavage
- C. Cut, clarity, colour, carat
- D. Cut, clarity, conductivity, composition

63. Cleavage occurs in diamond in 4 directions because

- A. because the forces bonding atoms together in those directions in the crystal structure are weak
- B. because the forces bonding atoms together in those directions in the crystal structure are strong
- C. it is a random phenomenon

64. Which of the following options lists the common sources of diamond?

- A. kimberlite
- B. granite
- C. pegmatite
- D. placer deposits
- E. lamprophyres

65. Where were diamonds sourced before they were found in South Africa?

- A. India
- B. Canada
- C. Australia
- D. Brazil
- E. a and d

66. Similarities between aquamarine and emerald are:

- A. crystal structure
- B. colour
- C. chromophores
- D. major element chemistry
- E. all the above
- F. a,d

67. Which of the following are considered fundamental physical properties of minerals?

- A. Hardness
- B. Refractive Index
- C. Cleavage
- D. Streak
- E. Specific Gravity
- F. All

69. What are PGM's used for?

- 1. Autocatalysts
- 2. Electronics
- 3. Jewelry
- 4. All the above

70. Which diamond is the record holder for the most expensive diamond ever sold at auction?

- 1. Wittlesbach Diamond
- 2. Koh-i-Noor Diamond
- 3. Cullinan Diamond
- 4. Hope Diamond

71. A "Canadian" diamond according to the Voluntary Code of Conduct for Authenticating Canadian Diamond Claims, is mined in Canada, but can be_____

- 1. Cut and polished in Antwerp
- 2. Cut and polished in Mumbai
- 3. Cut and polished in Yellowknife
- 4. All of the above

72. Of the emeralds discussed in the lectures, which one remains uncut?

- 1. Incomparable Emerald
- 2. Hooker Emerald
- 3. Mogul Emerald
- 4. Patricia Emerald

73. A volcanic rock _____:

- 1. forms from cooling on the surface of the Earth
- 2. forms cooling below the surface of the Earth
- 3. is an igneous rock
- 4. a+c
- 5. b+c

74. Blue colour in diamonds is caused by the presence of:

- 1. Nitrogen
- 2. Garnet
- 3. Graphite
- 4. Boron

EOSC 118 Questions – Module B: Colour from the Cosmos (25%)

1. A 15 carat unheated aquamarine from Brazil would be _____.
 - A. so large it would be found in a museum
 - B. of exceptional size
 - C. of small size
 - D. **of good size**
2. Which of the following is NOT a variety of gem beryl?
 - A. heliodor
 - B. morganite
 - C. **alexandrite**
 - D. goshenite
 - E. emerald
3. Where are the most valuable emeralds mined?
 - A. Brazil
 - B. **Colombia**
 - C. Pakistan
 - D. Austria
 - E. Canada
4. Emerald is more rare than aquamarine because _____.
 - A. aquamarine is only found in pegmatites
 - B. this statement is false, both gemstones are equally rare.
 - C. **chromium and beryllium do not commonly exist in the same geological environment**
 - D. green is a less commonly seen colour in minerals
 - E. emerald is only found in Colombia
5. A 2 carat cut emerald from Colombia would be _____.
 - A. so large it would be found in a museum
 - B. of small size
 - C. **of good size**
 - D. of exceptional size
6. Of the following, which country produces significant amounts of commercial emerald?
 - A. Russia
 - B. Canada
 - C. USA
 - D. Australia
 - E. **Brazil**
7. Which of the following BEST describes the chemical formula of corundum?
 - A. carbon polymorph
 - B. titanium chromium oxide
 - C. **aluminum oxide**
 - D. cyclosilicate
 - E. emerald
8. Why are "star" corundum gems typically larger (more carats) than faceted stones?
 - A. Faceting removes much weight from the starting material.
 - B. Naturally, these varieties are larger.
 - C. The rutile silk is heavy and adds to the overall weight.
 - D. This is not true, it is faceted stones that are typically larger.
 - E. **"Star" stones do not need to be transparent to show their beauty.**

9. Which of the following provinces/states does NOT (yet) have any corundum occurrences?

- A. Ontario
- B. British Columbia
- C. Nunavut
- D. Montana
- E. Yukon

10. What colour does the term "Kashmir" refer to for corundum?

- A. sea foam green
- B. canary yellow
- C. vivid velvety blue
- D. deep purple-red
- E. light sky blue

11. Historically, where were the most valuable rubies mined?

- A. Madagascar
- B. Canada
- C. Australia
- D. Cambodia
- E. Burma

12. A fine Burmese ruby would be "museum quality" if it exceeded how many carats?

- A. 20
- B. 1
- C. 5
- D. 10
- E. 0.5

13. Of the following, which is NOT a gem variety found in pegmatites?

- A. Emerald
- B. Spodumene
- C. Tourmaline
- D. Sapphire
- E. Diamond

14. Which of the following halogen elements is an essential structural constituent for topaz?

- A. bromine
- B. fluorine
- C. chlorine
- D. chromium
- E. iodine

15. Tourmaline with a pink core and green rim is often called _____.

- A. Ametrine
- B. Watermelon tourmaline
- C. Peach tourmaline
- D. Dichroite
- E. Chrome tourmaline

16. The open spaced areas in pegmatites that house many gem specimens are often called _____.

- A. pockets
- B. hot spots
- C. corrosion zones
- D. roots
- E. cores

17. What is amber?

- A. fossilized dinosaur excrement
- B. a gem variety of garnet
- C. a gem variety of quartz
- D. fossilized tree sap
- E. tree sap

18. Which of the following is one of the most famous localities for lapis lazuli?

- A. Lake Superior
- B. Chile
- C. Baffin Island, Nunavut
- D. Italian Mountain, Colorado
- E. Afghanistan

19. Which of the following phrases will make this statement TRUE? Rock hammers _____.

- A. are used to break rocks and expose fresh surfaces
- B. are generally 10X power
- C. are good for testing hardnesses of minerals
- D. can be used to test the habit of a mineral
- E. are more useful for gemologists than geologists

20. Which of the following phrases will make this statement TRUE? A translucent specimen _____.

- A. transmits less light than semi-transparent specimens
- B. transmits less light than opaque specimens
- C. will be isotropic
- D. transmits more light than semi-transparent specimens
- E. will be more valuable than an opaque specimen

21. The gemstone varieties emerald and aquamarine are part of which mineral group?

- A. Tourmaline
- B. Beryl
- C. Quartz
- D. Corundum
- E. Epidote

22. The "Black Prince's Ruby" is actually _____.

- A. diamond
- B. beryl
- C. garnet
- D. spinel
- E. sapphire

23. Which of the following is not a variety of gem corundum?

- A. colourless corundum
- B. tanzanite
- C. fancy sapphire
- D. sapphire
- E. ruby

24. The geochemistry of most pegmatites is normally closely related to _____.

- A. basalt
- B. kimberlite
- C. shale
- D. granite

E. gneiss

25. Topaz has a hardness of _____.

A. 10

B. 6

C. 8

D. 7

E. 9

26. What is the gem variety of the mineral olivine?

A. peridot

B. ruby

C. elbaite

D. tanzanite

E. emerald

27. Which of the following phrases will make this statement TRUE? Binocular gemological microscopes _____.

A. will reveal more inclusions than a 10X Loupe

B. are not powerful enough to discern the true clarity of a specimen

C. use only transmitted light

D. are only found in university institutions

E. will reveal the internal chemistry of a specimen

28. Which of the following phrases will make this statement TRUE? The dichroscope _____.

A. utilizes light reflected from a specimen

B. is used to determine the chemistry of minerals

C. estimates the hardness of a specimen without damaging it

D. is used to examine the optic class of minerals

E. is never used in tandem with other ID methods

29. What does the term "jardin" refer to for emeralds?

A. green colour

B. hardness

C. quality of cut

D. synthetic stones

E. inclusions

30. Which of the following provinces/territories does NOT (yet) have any emerald occurrences?

A. British Columbia

B. Ontario

C. Nunavut

D. Northwest Territories

E. Yukon

31. What gem does the term "gota de aceite" refer to?

A. ruby

B. sapphire

C. emerald

D. aquamarine

E. diamond

32. What is the common form of euhedral corundum crystals?

A. rhomb

B. "barrel" shaped tapering hexagonal prism

C. hexagonal prism terminating with a point

- D. water-worn pebbles
- E. pseudo-hexagonal prism

33. Which common mineral grouping does spodumene belong to?

- A. tourmaline
- B. amphibole
- C. feldspar
- D. corundum
- E. pyroxene

34. Which country is particularly famous for its pegmatite fields?

- A. Brazil
- B. Africa
- C. Austria
- D. Canada
- E. Thailand

35. The chromophore in Paraíba-type tourmaline is _____.

- A. titanium
- B. iron and titanium
- C. iron
- D. chromium
- E. copper

36. Most new pearls on the market today are _____.

- A. blister pearls
- B. cultured pearls
- C. harvested by shallow water free-divers
- D. imitation pearl
- E. mother of pearl

37. What is the gem variety of the mineral zoisite?

- A. kunzite
- B. peridot
- C. opal
- D. tanzanite
- E. garnet

38. Which of the following phrases will make this statement TRUE? Dispersion _____.

- A. describes the reflection of light that incidents on a medium of higher refractive index
- B. describes the spreading of light as a result of total internal reflection
- C. generates allochromatic colours in gemstones
- D. describes the spreading of light as a result of differential refraction
- E. is a unique property to diamond

39. What is the hardness of ruby and sapphire?

- A. 9
- B. 10
- C. 8
- D. 7
- E. 9.5

40. Which of the following is NOT a common source of gem corundum?

- A. Dirty Marbles
- B. Granite

C. Placer Deposits

D. Alkali Basalts

41. Most gem varieties from the tourmaline group have the base mineral _____.

- A. tourmaline
- B. dravite
- C. liddicoatite
- D. elbaite
- E. schorl

42. What are the two main colours shown by fine quality alexandrite?

- A. pink and red
- B. green and blue
- C. orange and green
- D. red and green
- E. blue and pink

43. Famous localities for turquoise include _____.

- A. southwest United States
- B. Egypt
- C. Iran
- D. All of these

44. Which of the following phrases will make this statement TRUE? A hand lens (or loupe) _____.

- A. should always be used with a petrographic microscope
- B. provides chemical information about a gemstone
- C. is normally of 30X magnification power
- D. is not particularly useful for geoscience
- E. is a critical tool for gemology and geology

45. The VISIBLE portion of the electromagnetic spectrum is in the _____ range.

- A. 260 - 350 nm
- B. 400 - 700 m
- C. 1 - 100 km
- D. 260 - 350 cm
- E. 400 - 700 nm

46. An example of a mineral that is a cyclosilicate:

- A. is beryl
- B. has ring structures of SiO₄ tetrahedra
- C. is corundum
- D. a, b
- E. a,b,c

47. What are some common treatments for beryl?

- A. Oiling
- B. Heat treatment
- C. Pressure treatment
- D. a,b,c
- E. a,b

48. Which of the following phrases will make this statement TRUE? Allochromatic minerals _____.

- A. always exhibit strong dispersion
- B. have their colour generated from physical optical effects

- C. have their colour generated from element impurities
- D. are isotropic
- E. contain chromium and vanadium

49. When speaking of light with respect to gems and jewellery, the terms "incandescent", "daylight", and "fluorescent" refer to _____.

- A. fluorescence of light
- B. sources of light
- C. intensity of light
- D. angle of light
- E. absorption of light

50. Which of the following phrases will make this statement TRUE? Incandescent light _____.

- A. is what gives diamond its fire
- B. is the best way to illuminate gemstones
- C. is more intense in the yellow to red portion of the electromagnetic spectrum
- D. is one of the main causes of colour in gems
- E. is least intense in the yellow to red portion of the electromagnetic spectrum

51. Visible light is a form of electromagnetic radiation

True

52. Dispersion is calculated by:

- A. the difference in the refractive index of the shortest and longest wavelengths of light
- B. the difference in the reflective index of the shortest and longest wavelengths of light
- C. the addition of the refractive index of the shortest and longest wavelengths of light
- D. the addition of the reflective index of the shortest and longest wavelengths of light

53. Reflection and refraction are the same phenomenon

False

54. What is the gem variety of the mineral zoisite?

- A. tanzanite
- B. garnet
- C. opal
- D. kunzite
- E. peridot

55. Emeralds occur in

- A. pegmatites
- B. metamorphosed schists
- C. alluvial deposits
- D. all the above

56. Which transition element is a common chromophore in both ruby and emerald

- A. Fe²⁺
- B. Cr³⁺
- C. Mn²⁺
- D. Ni²⁺

57. Which of the following minerals have hexagonal crystal symmetry?

- A. ruby (corundum)
- B. emerald (beryl)
- C. alexandrite (chrysoberyl)
- D. a,b
- E. a,b,c

58. The gem kunzite changes colour when viewed under different forms of lighting, such as sunlight and fluorescent

False

59. It is ideal to use an epoxy of a different refractive index when sealing fractures in a crystal.

False

60. The gem alexandrite changes colour when viewed under different forms of lighting, such as sunlight vs fluorescent. True

61. The sequence of rocks (from outside inwards) in a zoned pegmatite is _____.

A. core, core margin, wall, intermediate, border

B. border, wall, intermediate, core margin, core

C. border, Intermediate, Wall

D. border, intermediate, wall, core margin, core

E. core, core margin, intermediate, wall, border

62. Which of the following is NOT a gem variety of quartz _____.

A. opal

B. amber

C. amethyst

D. onyx

E. agate

63. Which of the following best describes the chemical formula of beryl?

A. emerald

B. aluminium oxide

C. beryllium aluminosilicate

D. carbon polymorph

E. chromium bearing beryllium oxide

64. The presence of Fe^{2+} in emerald and ruby has no effect on the red and green colours of those minerals

False

65. The parent mineral spodumene gives rise to which of the following gem varieties?

A. kunzite

B. emerald

C. elbaite

D. sapphire

E.morganite

65. The blue of Lapis Lazuli is primarily caused by which of the following minerals?

A. Lazurite and Sodalite

B. Diopside

C. Quartz

D. Lazurite

E. Calcite

EOSC 118 Questions – Module C: Mining and Major Metals (20%)

1. Of the following methods of mining, which is most cost intensive?

- A. artisanal
- B. underground
- C. placer
- D. strip
- E. open pit

2. How is the grade of an ore deposit normally reported?

- A. g / t
- B. nm
- C. g / m³
- D. g / oz
- E. Karats

3. The Highland Valley Mine is an example of an _____.

- A. open pit copper mine
- B. underground coal mine
- C. open pit silver mine
- D. underground copper mine
- E. underground silver mine

4. In BC, where does most of the mining take place?

- A. on Vancouver Island
- B. in the far north
- C. in the Rockies
- D. the southern regions
- E. only in SW BC

5. As a mineral, gold belongs to which crystal system?

- A. monoclinic
- B. hexagonal
- C. isometric
- D. triclinic
- E. tetragonal

6. What city has been the nearby hub for the Klondike goldfields?

- A. Juneau
- B. San Francisco
- C. Prince George
- D. Dawson City
- E. Whitehorse

7. How old are the oldest rocks (the Acasta Gneiss) of the Canadian Shield?

- A. 1.2 Billion years
- B. 156 Million years
- C. 3.9 Billion years
- D. 3.9 Million years

8. Gold has a density, in g/cm³, of _____.

- A. 1
- B. 2.6
- C. 19.3
- D. 99.9
- E. 10.1

9. The rocks that host the gold deposits of the Canadian Shield are often _____.

- A. granitoids
- B. volcanic greenstones
- C. quaternary cover
- D. pegmatites
- E. sedimentary cover

10. Different colours of gold are produced primarily from _____.

- A. inclusions of other minerals
- B. heating and quenching
- C. its opaque nature
- D. the temperature of gold formation
- E. alloying with other elements

11. Where was western Canada's first gold rush discovery in 1852?

- A. Wildhorse Creek
- B. Fraser
- C. Cariboo
- D. Queen Charlotte Island
- E. Klondike

12. Fair Trade jewellery and gems ensure responsible _____.

- A. social practices
- B. environmental practices
- C. labour practices
- D. chains of custody
- E. all of the above

13. Ethical, Green, and Fair Trade practices are too costly to implement widely in the gem and jewellery industry.

False

14. The film "Red Gold" was produced by _____.

- A. Northern Dynasty Minerals
- B. the State of Alaska
- C. the Pebble Partnership
- D. independent film makers
- E. the community of Bristol Bay

15. The Pebble Deposit is classified as a _____.

- A. giant deposit
- B. supergiant deposit
- C. moderate deposit
- D. large deposit
- E. small deposit

16. Common ore grade of a platinum deposit is only approximately _____.

- A. 0.4 g/t
- B. 4 g/t
- C. 15 g/t
- D. 40 g/t
- E. 4%

17. The total supply of platinum in 2008 was approximately _____.
- A. 2 million oz
 - B. 0.5 tonnes
 - C. 1 tonne
 - D. 55 million oz
 - E. 6 million oz
18. Platinum jewellery demand is dominated by _____.
- A. Europe
 - B. India
 - C. USA
 - D. China
 - E. Japan
19. Most PGEs mined today originate from _____.
- A. placer deposits
 - B. marbles
 - C. kimberlites
 - D. homogenous granites
 - E. layered intrusions
20. The word platinum is derived from _____.
- A. the Italian town Plata
 - B. the Greek word platalia
 - C. an allusion to silver
 - D. its characteristic plate like form
 - E. a tribute to Plato
21. How does Diavik move the bulk of their supplies to the minesite?
- A. by airplane to the nearby landing strip
 - B. by dogsled across the tundra
 - C. by truck over the winter road
 - D. by helicopter to the helipad
 - E. by boat along Lac de Gras
22. The deepest underground mine in the world is _____ kilometers deep.
- A. 0.5
 - B. 2
 - C. 1
 - D. 10
 - E. 4
23. Gold in placer deposits is recovered by _____.
- A. using x-rays to fluoresce the gold particles
 - B. sending the gravel to an acid leach pad
 - C. running pay dirt through sluice boxes
 - D. crushing and milling the ore
24. The most significant lode gold district in Canada by historical production is _____.
- A. Hope Bay
 - B. Bridge River
 - C. Yellowknife
 - D. Timmins
 - E. Hemlo

25. The alchemical symbol for gold alludes to the _____.
- A. sky
 - B. sun
 - C. king
 - D. flowers
 - E. ocean
26. Which of the following is NOT a type of lode gold deposit?
- A. mesothermal
 - B. orogenic
 - C. kimberlite
 - D. epithermal
 - E. intrusion-related
27. What is the age restriction on placer deposits?
- A. none
 - B. must be younger than glaciers
 - C. must be less than 1 million years
 - D. must be currently forming
 - E. must be less than 1,000 years
28. The continent most affected by artisanal and small-scale mining is _____.
- A. North America
 - B. Europe
 - C. South America
 - D. Asia
 - E. Africa
29. Development of the Pebble Mine will NOT impact _____.
- A. the local fisheries industry
 - B. the mining community
 - C. the economy of Bristol Bay
 - D. Northern Dynasty Minerals
 - E. all of these
 - F. none of these
30. The Pebble Deposit is _____.
- A. a kimberlite pipe
 - B. a mesothermal lode gold vein system
 - C. the location of a meteorite impact
 - D. a copper-gold porphyry system
 - E. a placer gold pay dirt lens
31. What are the names of the three main ore bodies of the Bushveld Complex?
- A. Merensky, Great Dyke, Platreef
 - B. Stillwater, Platreef, Merensky
 - C. Merensky, UG2, Platreef
 - D. UG1, UG2, UG3
 - E. Merensky, UG1, UG2
32. The most common use of the PGEs is for _____.
- A. jewellery
 - B. circuitry
 - C. dentistry
 - D. currency
 - E. autocatalysts

33. What are BC's top two commodities?

- A. diamonds and gold
- B. copper and gold
- C. coal and copper
- D. jade and coal
- E. silver and gold

34. Epithermal deposits _____.

- A. typically form at shallow depths
- B. are associated with volcanoes
- C. are the least important of Canada's gold deposits
- D. all of these
- E. none of these

35. Gold classifies as _____.

- A. a mineral
- B. a metal
- C. an element
- D. all of these

36. Mesothermal deposits _____.

- A. typically form at shallow depths
- B. are associated with volcanoes
- C. are the least important of Canada's gold deposits
- D. all of these
- E. none of these

37. Crystalline gold _____.

- A. is rare
- B. forms naturally
- C. is not always 100% Au
- D. is highly valued by collectors
- E. is all of these

38. Artisanal and small-scale mining is most commonly undertaken on _____.

- A. any high value mineral
- B. emeralds
- C. platinum
- D. gold
- E. diamonds

39. Canada's main source of PGEs is _____.

- A. the Great Dyke
- B. the Canadian Mint
- C. the Giant Mine
- D. the Sudbury Impact Structure
- E. Voisey's Bay

40. What is the core responsibility of the BC Geological Survey?

- A. mining of ore deposits
- B. reclamation of old mining sites
- C. development of advanced exploration projects
- D. conducting geoscience
- E. financing young exploration projects

41. The Diavik Diamond Mine is an example of _____.

- A. a deposit undergoing feasibility
- B. an open pit operation
- C. an open pit and underground operation
- D. an underground operation

42. Arrange the following in their proper sequence in mineral resource development.

- 1. [Geoscience]
- 2. [Exploration]
- 3. [Discovery]
- 4. [Development]
- 5. [Production]
- 6. [Reclamation]

43. Approximately how many tonnes of gold are mined yearly on a global scale?

- A. 1
- B. 1000
- C. 2500
- D. 10000
- E. 25

44. Recognition that improper mining and processing of precious metals and gemstones can cause social and environmental problems began in _____.

- A. 2003
- B. 1910
- C. it has always been recognized
- D. 1957
- E. 1812

45. When is the Pebble deposit slated to start mining?

- A. 2030
- B. 2009
- C. 2021
- D. never
- E. 2016

46. Cawthorn suggests the Bushveld Complex could supply the world's PGE demand for _____.

- A. 10 years
- B. 90 years
- C. indefinitely
- D. 40 years
- E. 5 years

47. The most common use of the PGEs is for _____.

- A. autocatalysts
- B. jewellery
- C. dentistry
- D. currency
- E. circuitry

48. How many ounces of gold have been pulled out of the Klondike?

- A. 100 million
- B. 12.5 million
- C. 0.5 million
- D. 1 million
- E. 3 million

49. Ethical, Green, and Fair Trade practices are too costly to implement widely in the gem and jewellery industry.

False

50. The most significant PGE deposit in the world is the _____.

- A. Great Dyke
- B. Stillwater Complex
- C. Sudbury Impact Structure
- D. Norilsk
- E. Bushveld Complex

51. Platinum was designated a distinct metal in which century?

- A. 20th
- B. 16th
- C. 17th
- D. 19th
- E. 18th

52. What are Canada's top two mineral commodities by value?

- A. potash and diamonds
- B. nickel and gold
- C. sulfur and zinc
- D. gold and diamonds
- E. potash and nickel

53. Which of the following is NOT a common use of gold?

- A. currency
- B. food
- C. dentistry
- D. electronics
- E. jewellery

54. Most lode gold deposits have a grade, in g/t, between _____.

- A. 1 and 5
- B. 10 and 100
- C. 2 and 15
- D. 0.05 and 0.5
- E. 0.1 and 1

55. Most new gem discoveries are followed by _____.

- A. intensive gemological studies
- B. global marketing of the new material
- C. rushes of artisanal miners
- D. strong government influence
- E. additional discoveries in the same region

56. PGM is an abbreviation for _____.

- A. Platinum Group Metals
- B. Platinum Group Minerals
- C. Platinum Group Mining
- D. All of the above
- E. A and B
- F. A and C

57. The PGEs display _____.

- A. resistance to corrosion
- B. chemical inertness
- C. good durability and strength
- D. the ability to catalyze reactions
- E. all of these