



NATIONAL Science Bee

V/JV Earth Science National Championship Exam

Name _____

School

Grade _____

Email address _____

Instructions – Circle the correct answer or leave it blank. Correct answers are worth 2 points. Incorrect answers are worth –1 point. Questions left blank are worth 0 points.

- The distance in degrees east or west of the prime meridian is
 - Latitude
 - Longitude
 - Declination
 - Projection
- The distance covered by a degree of longitude
 - Is 1/180 of Earth's circumference
 - Is always equal to 111 km
 - Increases as you approach the poles
 - Decreases as you approach the poles
- Which one of the following rocks would most likely form from the metamorphism of a shale?
 - Granite
 - Quartzite
 - Schist
 - Marble
- A compound that consists of chlorine or fluorine combined with sodium, potassium or calcium is
 - Gypsum
 - Halite
 - Galena
 - Hematite
- Compounds on Earth that contain a carbonate group include
 - Anhydrite
 - Copper
 - Fluorite
 - Dolomite
- What percentage of Earth's crust is made up of minerals that do NOT contain minerals with silicon and oxygen?
 - 10 %
 - 40 %
 - 4 %
 - 15 %
- Which of the following is not an example of a silicate tetrahedra arrangement
 - Hexagonal prism
 - Isolated tetrahedra
 - Single chain
 - Framework
- Where does Apatite fall on the Mohs Hardness Scale?
 - 9
 - 7
 - 5
 - 3
- Chatoyancy is a phenomenon where?
 - Minerals reflect light that displays a silky appearance
 - Minerals reflect a 6-sided star appearance
 - Ability to glow while in ultraviolet light
 - Ability to continue to glow after ultraviolet light is off
- Light passing through calcite minerals produces ?
 - A ringed halo effect
 - Double refraction
 - Asterism
 - Triclinic glow
- The words uneven and splintery describe a mineral's
 - Cleavage
 - Fracture
 - Hardness
 - Luster

12. When three axes of unequal length intersect at 90 degree angles, the structure is ?
- Hexagonal
 - Triclinic
 - Tetragonal
 - Orthorhombic
13. Bowen's Reaction Series explains
- The rapid rotations of heavenly bodies
 - The motion of the moon about the Earth forming phases
 - The order in which minerals form as magma cools
 - The characterization of silicate minerals
14. The continuous reaction series of mineral formation includes?
- Feldspar
 - Pyroxene
 - Olivine
 - Biotite
15. The theory that cyclical changes in Earth's orbit and in the tilt of Earth's axis occur over thousands of years and cause climatic changes is ?
- Abd al-Raham's Postulate
 - Big Bang Theory
 - Milankovitch's Theory
 - Kepler's Third Law
16. When magma cools and solidifies beneath Earth's surface, what type of rock forms?
- Intrusive igneous rock
 - Extrusive igneous rock
 - Basalt
 - Andesite
17. A condition of gravitational and buoyant equilibrium between the Earth's lithosphere and asthenosphere is called ?
- Crosscutting
 - Superposition
 - Mafic inertia
 - Isostasy
18. The process by which glaciers flow slowly as grains of ice deform under pressure and slide over each other?
- Glacial jet stream
 - Latent pressure flow
 - Internal plastic flow
 - Glacial drift
19. Which of the following is not a Galilean moon?
- Io
 - Enceladus
 - Europa
 - Ganymede
20. A mountain that forms where faulting breaks Earth's crust causing some blocks to drop down relative to others is a _____.
- Fault-block mountain
 - Fault compression mountain
 - Block superposition mountain
 - Extrusive block mountain
21. The degree of elongation of an elliptical orbit is
- External orbit
 - Orbital rebound
 - Orbital flux
 - Eccentricity
22. An observed change in the frequency of a wave when the source or observer is moving is ?
- The Doppler Effect
 - Wave acceleration
 - The electromagnetic shift
 - The Coriolis change
23. The hypothesis that states that continents once formed a single landmass, broke up and moved to their current positions is?
- Theory of Plate Tectonics
 - Pangaea Hypothesis
 - Continental Drift
 - Convective Push
24. Low-level billowy clouds commonly with tops resembling cotton balls and dark bottoms are ?
- Cumulus
 - Stratus
 - Alto cumulus
 - Cirrus
25. The region of the sun's interior that is between the radiative zone and photosphere is the
- Transmissive zone
 - Convective zone
 - Photo-absorptive zone
 - Contact zone
26. The process in which minerals precipitate into pore spaces between sediment grains and bind sediments to form rocks?
- Layering
 - Stratification
 - Binding strata
 - Cementation
27. A deep bowl-like depression produced by glacier erosion is a(n)?
- Blowout
 - Cirque

- C. Karst
D. Endorheic
28. A sloping layer of permeable rock sandwiched between 2 layers of impermeable rock exposed at the surface is a(n) ?
A. Artesian formation
B. Aquifer
C. Recharge zone
D. Ordinary well
29. A depression resulting from a phreatomagmatic eruption is called a(n)?
A. Caldera
B. Maar
C. Pit crater
D. Pull apart basin
30. The boundary between the crust and the mantle marked by the sudden increase in speed of seismic waves was discovered by ?
A. Clive Oppenheimer.
B. Naomi Oreskes
C. Andrija Mohorovicic
D. Michael E. Mann
31. An area along a fault where few earthquakes have occurred recently but where strong earthquakes occurred in the past is called a(n)?
A. Seismic surgency
B. Delayed onset
C. Latent activity
D. Seismic Gap
32. Large pyroclastic particles less than 64 mm in diameter are called ?
A. Volcanic bombs
B. Volcanic blocks
C. Lapilli
D. Mafic clusters
33. The process by which softer, less weather-resistant rock erodes and leaves more resistant rock is called ?
A. Differential weathering
B. Precipitous weathering
C. Selective erosion
D. Compositional erosion
34. Regolith is ?
A. Transported soil
B. A type of bat guano
C. A type of topographic elevation
D. Weathered rock fragments on Earth's surface
35. In humid tropical climates thick soils develop rapidly and are called ?
A. Laterites
B. Pedalfer
C. Humus
D. Loam
36. The large area of hypoxia in the Gulf of Mexico is caused by .
A. A large influx of fertilizers from farms along the Mississippi River
B. The long continental shelf off the coast
C. A large influx of fresh water dropping the salinity
D. The disruption of the floodplain across the Midwest
37. How does a plunge pool form?
A. By the erosional forces of wind
B. By the erosional forces of cascading water
C. By the falling debris from a cliff
D. By the temperature of the water
38. Which statement best relates deltas and alluvial fans?
A. They are exact synonyms
B. Alluvial fans form on land
C. Deltas form on land, and alluvial fans form in water
D. Both are deposits caused by a drop in stream flow velocity
39. Which of the following best describes the life cycle of lakes?
A. Springs, rivers, and runoff from land are sources of lake water
B. Most lakes are located at high latitudes
C. Most of the water in lakes comes from precipitation and melting snow
D. Many lakes disappear because the water evaporates or drains
40. The stream load that includes gravel and large rocks is ?
A. Suspended load
B. Runoff load
C. Dissolved load
D. Bed load
41. The largest hydroelectric dam in the world is
A. The Hoover Dam
B. The Three Gorges Dam
C. The Itaipu Dam
D. The Belo Monte Dam.

42. The amount of uniformity in the size of rocks or sediments is called
- Porosity
 - Spacing
 - Sorting
 - Grain spacing
43. The subsurface layer where groundwater seeps up from the water table by capillary action to fill pores is called ?
- The zone of saturation
 - The water table
 - The zone of Aeration
 - The capillary fringe
44. Spiral galaxies with small, luminous nuclei and particular spectra are known as ?
- The Large Magellanic Galaxy
 - Seyfert Galaxies
 - Cartwheel Galaxies
 - Triangulum Galaxies
45. The point where small atoms in interstellar gas fall and gain speed to form stars is called
- Free-fall collapse
 - Fragmentation
 - Shock
 - Protostellar Evolution
46. When a gas is so dense that its electrons are not free to change their energy, astronomers call it
- Dark matter
 - Interstellar nebulae
 - Interstellar matter
 - Degenerate matter
47. A helium flash occurs when?
- The first helium fusion begins
 - A triple alpha process occurs
 - Helium fusion begins with an explosion
 - The energy from fusion is absorbed
48. A star that can live 10 times longer than the sun and has a mass of 0.4 solar mass is called
- A White Dwarf
 - A Red Dwarf
 - A Red Giant
 - A Protostar
49. Flamelike jets of gas extending into the chromosphere are called ?
- Spicules
 - Magnetic carpets
 - Supergranules
 - Limbs
50. Absorption of light in the photosphere can cause ?
- Limb darkening
 - Ultra Granule formation
 - Convection
 - Solar wind
51. The magnetic cycle explained as a progressive tangling of the solar magnetic field is known as
- The Dynamo Effect
 - Differential Rotation
 - The Babcock Model
 - Maunder Minimum
52. Atoms in a magnetic field can absorb several different wavelength photons rather than one. This is called
- The Zeeman Effect
 - Simultaneous Ultraviolet Absorption
 - Active UV Regions
 - Spectral Line Unity
53. Why are the Hydrogen Balmer lines in a giant star narrower than a main sequence star?
- The atmosphere is less dense, thus less collisions
 - The atmosphere is more dense, thus less collisions
 - The atmosphere is less dense, thus more collisions
 - The atmosphere is more dense, thus more collisions
54. Interstellar media that has temperatures around 1 million Kelvin and emit x-rays is called
- Coronal Gas
 - Giant Molecular Clouds
 - Local Bubble Effect
 - Cold Dust
55. How is the blue color of a reflection nebula related to the blue color of the daytime sky?
- They both have large acceleration of particles
 - They both have similar rotational motions
 - They both scatter and reflect more blue light
 - The nebula blue is caused by interstellar dust and in the sky by difference in scattering
56. The CNO cycle of fusing hydrogen into helium is seen in
- Stars less massive than 1 solar mass
 - Stars less massive than 0.4 solar mass
 - Stars that lie between 0.4 and 1 solar mass
 - Stars more massive than 1.1 solar mass

57. The flow of energy by radiation in stars is controlled by the
- Opacity of the gas
 - Heat driven circulation of the gas
 - Transparency of the gas
 - The convection currents of the gas
58. The resistance of protons to being combined is called
- CNO diffusion
 - A traffic jam
 - A Coulomb barrier
 - A transportation chain
59. When matter spirals into a Neutron star
- There is no detectable burst of energy
 - There is a detectable burst of energy
 - There is a partial ejection of that matter
 - An accretion disk forms
60. Which astronomer coined the term island universes
- Heber D. Curtis
 - Harlow Shapley
 - Edwin Hubble
 - Immanuel Kant
61. A Tragedy of the Commons (shared resource depletion) problem that could affect the Midwestern US ability to grow crops is
- Excessive rainfall caused by El Nino
 - Depletion of the Ogallala Aquifer
 - Deforestation in Oklahoma
 - Excessive erosion caused by rain
62. Flat-topped submerged seamounts caused when islands move away from a hot spot and sink are called
- Guyots
 - Atolls
 - Abyssal Hills
 - Mid-Ocean Ridges
63. Large quantities of inorganic sediments travel at more than 100 km/h toward the abyssal plain in
- Turbidity currents
 - Diatom blooms
 - Diatomaceous currents
 - Nodule congregations
64. Ice-rafted debris contribute to ocean-basin sediment by
- Accumulation and sinking of arctic sea ice
 - Icebergs formed from retreating ice sheets
 - Moraines from retreating glaciers
 - Saharan dust storms that span across the Atlantic and Northern Atlantic
65. Why is the ocean considered to be a carbon sink?
- Ocean basins contain large amounts of organisms that use carbon for their shells
 - Carbon is used as a basis for oceanic life
 - Oceans dissolve carbon dioxide and trap it for hundreds of years
 - Gaseous carbon dioxide is released when oceans warm
66. Dissolved solids make up about _____ of the mass of ocean water.
- 7.7%
 - 30.6%
 - 0.7%
 - 3.5%
67. An example of a persistent organic pollutant (POP) seen in the ocean is
- DDT
 - Nuclear waste
 - Upwelling detritus
 - Mercury
68. Oceanic convection currents in the ocean are caused primarily by
- Cold water moving from the Poles
 - Unequal heating of the earth by the sun
 - Warm air moving northward
 - Weakened trade winds
69. Since the Industrial Revolution, ocean acidity has increased by
- 10%
 - 15%
 - 20%
 - 30%
70. What does not happen during El Nino years?
- Upwelling of nutrient dense water decreases along So. American coast
 - Trade winds weaken
 - Warm water builds up along Asia and Australia
 - Increased rainfall occurs on the west coast of So. America
71. Which type of clouds are rare, high-altitude clouds made entirely of ice crystals?
- Cirrocumulus
 - Cirrostratus
 - Cirrohalo
 - Altostratus

72. An instrument that records humidity, air pressure and temperature from helium-filled weather balloons is called a(n)_____.
- A. Radio detection and ranging meter
 - B. Radiosonde
 - C. Anemometer
 - D. Barometer
73. A region of space containing hundreds of objects mainly made of ice is called the
- A. Galactic Center Region
 - B. Active Galactic Nucleus
 - C. Galactic Halo
 - D. Kuiper Belt
74. The diamond-ring effect is seen during a(n)
- A. Penumbral eclipse
 - B. Annular eclipse
 - C. Total solar eclipse
 - D. Total lunar eclipse
75. Which of the following helps produce magnetic fields within the sun?
- A. The movement of the sun's rotation
 - B. Heat produced by nuclear fusion
 - C. Cooling off cycles in the convection zone
 - D. Large amounts of metals in sun's outer layers

Earth Science Answer Key:

- 1) B
- 2) D
- 3) C
- 4) B
- 5) D
- 6) C
- 7) A
- 8) C
- 9) A
- 10) B
- 11) B
- 12) D
- 13) C
- 14) A
- 15) C
- 16) A
- 17) D
- 18) C
- 19) B
- 20) A
- 21) D
- 22) A
- 23) C
- 24) A
- 25) B
- 26) D
- 27) B
- 28) A
- 29) B
- 30) C
- 31) D
- 32) C
- 33) A
- 34) D
- 35) A
- 36) A
- 37) B
- 38) D
- 39) D
- 40) A
- 41) B
- 42) C
- 43) D
- 44) B
- 45) A
- 46) D
- 47) C
- 48) B
- 49) A
- 50) A
- 51) C
- 52) A
- 53) B
- 54) A
- 55) C
- 56) D
- 57) A
- 58) C
- 59) B
- 60) D
- 61) B
- 62) A
- 63) A
- 64) B
- 65) C
- 66) D
- 67) A
- 68) B
- 69) D
- 70) C
- 71) A
- 72) B
- 73) D
- 74) C
- 75) B