CLASH Science Bowl

Replacements - Earth & Space

*Unedited

23 Tossups, 24 Bonuses



MS RR1 TOSSUP, SHORT ANSWER What is the name for a large ice platform floating on the ocean and extending out from a glacier?

ANSWER: Ice shelf [VJ] GLADES 2

MS RR1 BONUS, SHORT ANSWER What fossils are formed when volcanic ash rapidly buries trees, which then come into contact with mineral-rich groundwater, allowing for the precipitation of chalcedony?

ANSWER: Petrified wood [VJ, ZZ] GEO 3

MS RR2 TOSSUP, SHORT ANSWER What mineral on Bowen's reaction scale has the lowest crystallization temperature?

ANSWER: Quartz [VJ, ZZ] GEO 2

MS RR2 BONUS, SHORT ANSWER What sulfide mineral is the most common ore of lead?

ANSWER: Galena [ZZ] GEO 3

MS RR3 TOSSUP, SHORT ANSWER Between what 2 geological periods did the extinction occurring about 60 million years ago, which wiped out over 75% of the species at the time, occur?

ANSWER: Cretaceous and Paleogene [VJ, ZZ] GEO 5

MS RR3 BONUS, MULTIPLE CHOICE What is the term for the area where tributaries meet the mainstem of a river?

W) Node
X) Confluence
Y) Junction
Z) Collocation

ANSWER: X) Confluence [MP, ZZ] HYDRO 5

MS SW1 TOSSUP, SHORT ANSWER Order the following 3 layers of the Earth in increasing thickness:

1) Lithosphere
2) Asthenosphere
3) Upper mantle

ANSWER: 1, 2, 3 [ZZ] GEO 6

MS SW1 BONUS, SHORT ANSWER What type of water is formed when freshwater discharged begins mixing with saltwater?

ANSWER: Brackish [ZZ] HYDRO 5

MS SW2 TOSSUP, SHORT ANSWER What glacial landform refers to a lake that fills a bowl-shaped depression or valley, also known as a cirque?

ANSWER: Tarn [VJ] GLADES 7

MS SW2 BONUS, SHORT ANSWER What type of aquifer occurs above the regional water table?

ANSWER: Perched [MP] HYDRO 7

MS SW3 TOSSUP, MULTIPLE CHOICE Which of the following orbits has a period of a sidereal day, but does not hover over the same location on Earth?

W) Geosynchronous
X) Geostationary
Y) Solarsynchronous
Z) Solarstationary

ANSWER: W) Geosynchronous [ZZ] SOLR 4

MS SW3 BONUS, SHORT ANSWER Order the following 3 fates of our universe by increasing dark energy amount present:

1) Big crunch
2) Big rip
3) Big freeze

ANSWER: 1, 3, 2 [ZZ] INTR 7

MS SW4 TOSSUP, MULTIPLE CHOICE Changes in the polarization of iron domains inside of rocks near mid ocean ridges is a signifier of which of the following events:

W) Reversal of Earth's magnetic field
X) Alternating metal deposition
Y) Tectonic plate mantle detachment
Z) Increase in core-mantle heat convection

ANSWER: W) Reversal of Earth's magnetic field [ZZ] GEO 6

MS SW4 BONUS, SHORT ANSWER Binary black hole systems are detected using sensors such as LIGO because of what disturbances in spacetime?

ANSWER: Gravitational waves [ZZ] INTR 9

MS SW5 TOSSUP, SHORT ANSWER Because the Sun is a main-sequence star, what stellar remnant will it leave after its life cycle ends?

ANSWER: Planetary nebula [ZZ] STLR 7

MS SW5 BONUS, MULTIPLE CHOICE Which of the following correctly describes the sorting of sediment in a levee:

W) Largest sediments closer to the river
X) Largest sediments further from the river
Y) Largest sediments distributed throughout the levee
Z) No distinguishable pattern in sorting

ANSWER: W) Largest sediments closer to the river [ZZ] GEO 7

MS FINALS TOSSUP, SHORT ANSWER What karst topography structures are tall, made of soluble rock such as limestone, and left behind after surrounding rock is dissolved?

ANSWER: Towers [ZZ] GEO 10

MS FINALS BONUS, MULTIPLE CHOICE The Mohs scale is not linear! Approximately how many time harder is diamond than corundum?

W) 1
X) 4
Y) 10
Z) 25

ANSWER: X) 4 [ZZ] GEO 9

HS RR1 TOSSUP, SHORT ANSWER What is the name of a long, linear chain of volcanoes formed by the movement of a tectonic plate over a stationary hotspot in the Earth's mantle?

ANSWER: Nematath [VJ] GEO 10

HS RR1 BONUS, SHORT ANSWER What atmospheric cell relies most heavily on the collision-coalescence process to form precipitation?

ANSWER: Hadley [VJ] METEO 7

HS RR2 TOSSUP, SHORT ANSWER Chandler, Arizona, has annual monsoons which lead to a wet season, in which new continual streams flow throughout July and August. The streams, which flow only during the wet season, are known as what?

ANSWER: Intermittent streams (DO NOT ACCEPT: Ephemeral streams) [VJ, ZZ] HYDRO 5

HS RR2 BONUS, SHORT ANSWER Recessional moraines left by a retreating glacier leaves behind small chains of lakes known as what?

ANSWER: Paternoster lakes [ZZ] GLADES 7

HS RR3 TOSSUP, SHORT ANSWER What type of estuary is characterized by river dominated flow where freshwater moves over a triangular prism of saltier water?

ANSWER: Salt wedge [MP] HYDRO 8

HS RR3 BONUS, SHORT ANSWER Some research indicates that the End-Permian extinction may have occurred due to dips in magnetic field strength, which could have depleted oxygen due to what streams of charged particles that are released by the Sun?

ANSWER: Solar wind [VJ] ASTRO 6

HS RR4 TOSSUP, SHORT ANSWER What term is used to describe the process where plate motion compresses a plate margin to build mountains?

ANSWER: Orogenesis (ACCEPT: Orogeny) [MP] GEO 5

HS RR4 BONUS, SHORT ANSWER What type of twinning is formed by having multiple contact twins with surfaces parallel to each other that causes the labradorescence seen in labradorite?

ANSWER: Polysynthetic [MP] GEO 10

HS RR5 TOSSUP, SHORT ANSWER High mass stars are usually unstable due to what limit that sets the maximum luminosity for a star at hydrostatic equilibrium?

ANSWER: Eddington limit [VJ] STLR 8

HS RR5 BONUS, SHORT ANSWER What model is a scenario for the migration of planetary and non-planetary bodies in the solar system, specifically characterized by the migration of the gas giants into their present positions after the proplanetary disk dissipated?

ANSWER: Nice model [VJ] SOLR 11

HS DE1 TOSSUP, MULTIPLE CHOICE Above the core-mantle boundary of the Earth, there are 2 large provinces thought to be originating from subducted oceanic crust accumulating. These large provinces also associate with superplumes that most notably display a drastically lower value for which of the following quantities?

W) P-wave velocity
X) S-wave velocity
Y) Iron concentration
Z) Silicate concentration

ANSWER: X) S-wave velocity [VJ] GEO 9

HS DE1 BONUS, SHORT ANSWER Order the following wetlands by increasing average soil acidity:

1) Bog
2) Fen
3) Swamp

ANSWER: 2, 3, 1 [MP] GEO 9

HS DE2 TOSSUP, SHORT ANSWER What horizontal oceanic layer has the minimum speed of sound within a water column, allowing for the propagation of low-frequency sound waves for long distances?

ANSWER: SOFAR channel (ACCEPT: Deep sound channel) [ZZ] HYDRO 10

HS DE2 BONUS, SHORT ANSWER Order the following 4 stages in chronological order of tornado development:

1) Funnel cloud
2) Mesocyclone
3) Tornado
4) Wall cloud

ANSWER: 2, 4, 1, 3 [VJ] METEO 10

HS DE3 TOSSUP, MULTIPLE CHOICE The Sverdrup measures how many cubic meters of water per second in volumetric flow rate?

W) 1
X) 1,000
Y) 1,000,000
Z) 1,000,000,000

ANSWER: Y) 1,000,000 [SB, ZZ] HYDRO 8

HS DE3 BONUS, SHORT ANSWER Which moon is responsible for the Encke gap in saturn?

ANSWER: Pan [VJ] SOLR 10

HS DE4 TOSSUP, MULTIPLE CHOICE What high-pressure region in Asia is responsible for fueling the East Asian winter monsoon?

W) Korean high
X) Mongolian high
Y) Indian high
Z) Siberian high

ANWER: Z) Siberian high [VJ] METEO 11

HS DE4 BONUS, MULTIPLE CHOICE The process of erosion that occurs during rock collision and transportation, usually during aeolian or fluvial processes, is referred to by which of the following names?

W) Deflation
X) Cavitation
Y) Attrition
Z) Mass wasting

ANSWER: Y) Attrition [VJ] HYDRO 12

HS DE5 TOSSUP, MULTIPLE CHOICE When looking at strata to try to determine when Blue Diamond interrupted Garnet's wedding, Ziang finds sole markings between two of the layers. Which of the following is not a type of sole marking?

W) Flute cast
X) Hammer mark
Y) Tool mark
Z) Groove cast

Answer: X) Hammer mark [MP] HYDRO 13

HS DE5 BONUS, SHORT ANSWER To one significant figure, what is the velocity of an object at perihelion orbiting a sun with mass 1×10^{30} kilograms if the semimajor axis is 1 astronomical unit and the eccentricity is 0.5?

ANSWER: 40,000 [VJ] APHYS 11

HS DE6 BONUS, MULTIPLE CHOICE The Penrose process extracts rotational energy from a Kerr black hole through which of the following mechanisms?

W) Hawking radiation tunneling across the event horizon
X) A magnetic field threading the horizon and channeling a Poynting flux outward
Y) A particle splitting inside the ergosphere, allowing one fragment to gain negative energy
Z) Gravitational radiation emitted by a binary inspiral within the photon sphere

ANSWER: Y) A particle splitting inside the ergosphere, allowing one fragment to gain negative energy [VJ] INTR 11

HS DE7 TOSSUP, SHORT ANSWER If the Earth existed under high-pressure conditions of crystals forming in the silicate liquidus, what process may be the dominant mechanism of planetary differentiation, where iron droplets flow through gaps within the silica crystals?

ANSWER: Percloration [VJ] GEO 17

HS DE7 BONUS, MULTIPLE CHOICE Which of the following best describes the orientation of the first and third principal stress axes, respectively, for a normal fault?

W) Vertical, vertical
X) Vertical, horizontal
Y) Horizontal, vertical
Z) Horizontal, horizontal

ANSWER: X) Vertical, horizontal [MP] GEO 15

HS DE8 TOSSUP, SHORT ANSWER Calcite is known to "twinkle" in thin sections because of a change in what optical property that describes the contrast between a mineral and its surroundings, caused by a difference in refractive indices?

ANSWER: Optical relief (ACCEPT: Relief) [MP] GEO 17

HS DE8 BONUS, SHORT ANSWER Order the following three types of deltas by increasing river dominance

1) Cuspate
2) Elongate
3) Lobate

ANSWER: 1, 3, 2 [MP] HYDRO 17

HS FINALS 1 TOSSUP, SHORT ANSWER Aragonite and some varieties of quartz display a hexagonal habit despite not being a part of the hexagonal crystal system. What is the name of this type of habit?

ANSWER: Pseudohexagonal [MP] GEO 17

HS FINALS 1 BONUS, MULTIPLE CHOICE Though hexavacancy rings could potentially form in diamonds, they have not been detected. Which of the following is most likely the reason why?

W) Multivacancy chains are more common than hexavacancy rings, so they exist in much lower numbers
X) Hexavacancies are very unstable and do not last long within diamonds
Y) Hexavacancy rings are invisible to most spectroscopies
Z) The conditions that can lead to the production of hexavacancy rings are too hyperspecific

ANSWER: Y) Hexavacancy rings are invisible to most spectroscopies [MP] GEO 18

HS FINALS 2 TOSSUP, SHORT ANSWER What is the sum of all the density parameters in the universe?

ANSWER: 1 [VJ] COSMO 17

HS FINALS 2 BONUS, MULTIPLE CHOICE While studying augite, Hitai notices cations arranged in a large, irregular polyhedron occupied by cations in 8-fold coordination with oxygen. What cation is Hitai most likely to see in this polyhedron?

W) Calcium
X) Magnesium
Y) Aluminium
Z) Iron

ANSWER: W) Calcium [MP] GEO 19