TOSS-UP

1) EARTH AND SPACE *Multiple Choice* Which of the following factors has the greatest effect on soil formation?

W) Time
X) Climate
Y) Biological activity
Z) Slope

ANSWER: X) Climate

BONUS

1) EARTH AND SPACE *Multiple Choice* What type of soil would be found if you dug up a sample of soil from California?

W) Pedalfers
X) Pedocals
Y) Laterites
Z) Histosols

ANSWER: X) Pedocals

TOSS-UP

2) EARTH AND SPACE *Short Answer* Coby is in his submarine exploring the mid-Atlantic ridge. Which types of smokers would he most commonly see?

W) Black smokers
X) White smokers
Y) Gray smokers
Z) He would fail to pilot the submarine and he would accidentally fall inside

ANSWER: W) Black smokers

BONUS

2) EARTH AND SPACE *Short Answer* Order the following four moons from smallest to largest based off of their diameters: 1 - Titan; 2 - Ganymede; 3 - Triton; 4 - Oberon

ANSWER: 4, 3, 1, 2 (ACCEPT: Oberon, Triton, Titan, Ganymede)

TOSS-UP

3) EARTH AND SPACE *Multiple Choice* What makes up the largest percentage of the universe's composition?

W) Dark energy
X) Dark matter
Y) Matter
Z) Radiation

ANSWER: W) Dark energy

BONUS

3) EARTH AND SPACE *Short Answer* Order the following 4 elements that compose the universe from most abundant to least abundant: 1 - Carbon, 2 - Hydrogen, 3 - Helium, 4 - Iron

ANSWER: 2, 3, 1, 4 (ACCEPT: Hydrogen, Helium, Carbon, Iron)

TOSS-UP

4) EARTH AND SPACE *Multiple Choice* Which of the following technologies is used to measure the depth of ocean floors?

W) LASER
X) VLBI
Y) SONAR
Z) CHARA

ANSWER: Y) SONAR

BONUS

4) EARTH AND SPACE *Short Answer* Rank the following 4 layers in the Ocean from shallowest to deepest:
1 - Continental shelf, 2 - Abyssal Plain, 3 - Oceanic trench, 4 - Continental slope

ANSWER: 1, 4, 2, 3 (ACCEPT: Continental shelf, Continental slope, Abyssal Plain, Oceanic trench)

TOSS-UP

5) EARTH AND SPACE *Multiple Choice* What year will Halley's Comet next appear in the night sky?

W) 2026
X) 2061
Y) 2098
Z) 2125

ANSWER: X) 2061

BONUS

5) EARTH AND SPACE *Short Answer* Arrange the following 4 Big Bang eras from earliest to latest: 1 - GUT Era, 2 - Planck Era, 3 - Particle Era, 4 - Electroweak Era

ANSWER: 2, 1, 4, 3 (ACCEPT: Planck Era, GUT Era, Electroweak Era, Particle Era)

TOSS-UP

6) EARTH AND SPACE *Multiple Choice* In which of the following layers of the ionosphere do auroras generally occur in?

W) D-Layer
X) E-Layer
Y) F1-Layer
Z) F2-Layer

ANSWER: X) E-Layer

BONUS

6) EARTH AND SPACE *Short Answer* Rank the following cloud types from lowest altitude to highest altitude: 1 - Cirrocumulus, 2 - Nimbostratus, 3 - Stratocumulus

ANSWER: 2, 3, 1 (ACCEPT: Nimbostratus, Stratocumulus, Cirrocumulus)

TOSS-UP

7) EARTH AND SPACE *Short Answer* Which of the following mostly makes up the chemical composition of Venus' clouds?

W) Carbon dioxide
X) Water vapor
Y) Sulfuric acid
Z) Carbonyl sulfide

ANSWER: Y) Sulfuric acid

BONUS

7) EARTH AND SPACE *Short Answer* The clouds on Venus rain sulfuric acid, but this rain never reaches the ground due to the high temperatures which evaporates the rain before it reaches the ground, causing them to rise up into the clouds again. What rare phenomenon describes this type of precipitation shown by Venus' clouds?

ANSWER: Virga OR Virga rain

TOSS-UP

8) EARTH AND SPACE *Multiple Choice* In a flowing stream, which of the following particles would get deposited first?

W) Clay
X) Sand
Y) Silt
Z) Pebbles

ANSWER: Z) Pebbles

BONUS

8) EARTH AND SPACE *Short Answer* Identify all of the following 4 rocks that have a crystalline texture:
1 - Conglomerate, 2 - Rock salt, 3 - Dolostone, 4 - Siltstone

ANSWER: 2 and 3 OR Rock salt and Dolostone (In any order)

TOSS-UP

9) EARTH AND SPACE *Multiple Choice* Sanjay, David, and Stanford all hop on a boat that is traveling down a meandering river. At which parts of the river would they be traveling at the fastest speed?

W) At the cut bank
X) At the point bar
Y) At the floodplain
Z) They wouldn't travel because they're too heavy for the boat to hold up

ANSWER: W) At the cut bank

BONUS

9) EARTH AND SPACE *Short Answer* What term describes the imaginary line that connects the lowest points in a river?

ANSWER: Thalweg

TOSS-UP

10) EARTH AND SPACE *Multiple Choice* Icebergs are produced when large chunks of ice break from the front of a glacier during what process?

ANSWER: Calving

BONUS

10) EARTH AND SPACE *Short Answer* Rank the following continents from least to greatest based on the percentage of glaciers they hold: 1 - North America, 2 - Antarctica, 3 - Asia, 4 - Africa

ANSWER: 4, 3, 1, 2 (ACCEPT: Africa, Asia, North America, Antarctica)

TOSS-UP

11) EARTH AND SPACE *Multiple Choice* Sanjay, David, and Stanford get hired by NASA to go on the next Apollo mission to the moon. They aim to make a landing in the Mare Tranquillitatis. What rock would they most likely find there?

W) Anorthosites
X) Granites
Y) Basalts
Z) They wouldn't find anything because they would fail the landing

ANSWER: Y) Basalts

BONUS

11) EARTH AND SPACE *Short Answer* What track do infant stars of less than 3 solar masses that are in the PMS stage of stellar evolution follow?

ANSWER: Hayashi Track

TOSS-UP

12) EARTH AND SPACE *Multiple Choice* What type of volcanoes mostly make up Mars' volcanoes?

W) Shield Volcanoes
X) Stratovolcanoes
Y) Composite Volcanoes
Z) Cinder cones

ANSWER: W) Shield Volcanoes

BONUS

12) EARTH AND SPACE *Short Answer* Match each of the following features with their respective planets:
1 - Gula Mons, 2 - Valles Marineris, 3 - Caloris Basin

ANSWER: 1 is Venus, 2 is Mars, 3 is Mercury (ACCEPT: Gula Mons is Venus, Valles Marineris is Mars, Caloris Basin is Mercury) (In any order)

TOSS-UP

13) EARTH AND SPACE *Multiple Choice* The no-hair theorem states that all black hole solutions of the Einstein–Maxwell equations of gravitation and electromagnetism in general relativity can be completely characterized by only three externally observable factors. Which of the following is not one of the factors?

W) Linear Momentum
X) Angular Momentum
Y) Electric charge
Z) Mass

ANSWER: W) Linear momentum

BONUS

13) EARTH AND SPACE *Short Answer* The Middleton High School science bowl team is going on a field trip. They visit a black hole and Sanjay accidentally falls in. David, being the good teammate he is, does absolutely nothing. From David's perspective, how would Sanjay's fall appear?

W) His fall would appear to take longer than it would appear to Sanjay
X) His fall would appear to be shorter than it would appear to Sanjay
Y) His fall would take the same amount of time from both people's perspectives
Z) Sanjay wouldn't fall in because his mass is too large for the black hole to suck in

ANSWER: W) His fall would appear to take longer than it would appear to Sanjay

TOSS-UP

14) EARTH AND SPACE *Multiple Choice* Aqua decides to build his own submarine to go explore the ocean. Which of the following vertical ocean zones would he mostly likely find Anglerfish in?

W) Photic Zone
X) Twilight Zone
Y) Aphotic Zone
Z) The Abyss

ANSWER: Y) Aphotic Zone

BONUS

14) EARTH AND SPACE *Short Answer* What term is used to describe how the constantly moving system of deep-ocean circulation that is driven by temperature and salinity?

ANSWER: Ocean conveyor belt

TOSS-UP

15) EARTH AND SPACE *Multiple Choice* The height, length, and period of a wave depends on three major factors. Which of the following is not a factor?

W) Wind speed
X) Duration of wind
Y) Fetch
Z) Water temperature

ANSWER: Z) Water temperature

BONUS

15) EARTH AND SPACE *Multiple Choice* Which of the following is not a protective structure that was built to protect coastal erosion?

W) Jetties
X) Groins
Y) Seawalls
Z) Harbors

ANSWER: Z) Harbors

TOSS-UP

16) EARTH AND SPACE *Multiple Choice* Which of the following comets famously collided with Jupiter, providing the first direct observation of an extraterrestrial collision in the Solar System?

W) Hale-Bopp
X) ISON
Y) Shoemaker-Levy 9
Z) Hyakutake

ANSWER: Y) Shoemaker-Levy 9

BONUS

16) EARTH AND SPACE *Short Answer* Based off of the planets visible in the night sky to the naked eye, answer these questions: 1 - Which planet moves the slowest across the night sky on average, 2 - Which planet moves the fastest across the night sky on average?

ANSWER: 1 is Saturn and 2 is Mars OR Saturn moves the slowest across the night sky while Mars moves the fastest across the night sky (in any order)

TOSS-UP

17) EARTH AND SPACE *Short Answer* What term describes organisms living on or in the bottom of the ocean that mainly survive by feeding on marine snow?

ANSWER: Benthos OR Benthic organisms

BONUS

17) EARTH AND SPACE *Short Answer* Classification of Marine organisms often fall under the 3 categories of Plankton, Nekton, and Benthos. Match the following 3 organisms with their respective classification:
1 - Squid, 2 - Diatoms, 3 - Sea star

ANSWER: 1 is Nekton, 2 is Plankton, and 3 is Benthos OR Squid are Nektons, Diatoms are Planktons, and Sea stars are Benthos (In any order)

TOSS-UP

18) EARTH AND SPACE *Multiple Choice* As a comet moves closer to the Sun, the comet nucleus starts sublimating and will leave behind a tail. Which way will the comet's tail point as it orbits the Sun?

W) Away from the Sun
X) Towards the Sun
Y) Pointed towards Polaris
Z) In a random direction

ANSWER; W) Away from the Sun

BONUS

18) EARTH AND SPACE *Short Answer* It is Ivan's birthday and he wants to take his imaginary friends to go visit a planetary nebula. Ivan decides to collect some stardust as a souvenir. What 2 elements is Ivan most likely going to find in his sample?

ANSWER: Hydrogen and Helium

TOSS-UP

19) EARTH AND SPACE *Multiple Choice* The Cool Chicken has a fish fetish and wants to go back in time to revisit the earliest fishes. What geologic period would he have to go back to if he wanted to see the fishes?

W) Cambrian
X) Ordovician
Y) Silurian
Z) Devonian

ANSWER: Z) Devonian

BONUS

19) EARTH AND SPACE *Short Answer* What eon, era, period, and epoch are we currently in?

ANSWER: Phanerozoic Eon, Cenozoic Era, Quaternary Period, Holocene Epoch (In any order)

TOSS-UP

20) EARTH AND SPACE *Short Answer* What term describes the optical defect that refracting telescopes suffer from?

ANSWER: Chromatic Aberration

BONUS

20) EARTH AND SPACE *Short Answer* Deadbird402 has no friends and has taken to stargazing in hope that he will find aliens who will be friends with him. Because he is broke, he can only buy a cheap telescope. Calculate the telescope's light gathering power if the diameter of the telescope objective is 20 cm and the diameter of the pupil of his eye is 5 cm.

ANSWER: The telescope gathered 16 times more light that the eye

Formula - Light gathering power (LGP) = diameter of the telescope objective (Do) divided by the diameter of the pupil of the eye (Dp) squared)

TOSS-UP

21) EARTH AND SPACE *Short Answer* What is the name of the zone where the northeast and southeast trade winds converge, known by sailors as the doldrums or the calms because of its windless weather?

ANSWER: Intertropical Convergence Zone OR ITCZ

BONUS

21) EARTH AND SPACE *Short Answer* Aqua recently went to California and he collected a 1000 gram sample of seawater from the ocean. Answer the following 2 questions about Aqua's sample: 1 - What is the approximate salinity of Aqua's sample, 2 - What would be the 2 most abundant elements in his sample?

ANSWER: 1 - 3.5% / 35‰ / 35 grams out of 1000 grams, 2 - Sodium and Chloride (In any order)

TOSS-UP

22) EARTH AND SPACE *Multiple Choice* Plutons are structures that result from the cooling and hardening of magma at depth. Which of the following features is not a pluton?

W) Sills
X) Laccolith
Y) Dike

Z) Caldera

ANSWER: Z) Caldera

BONUS

22) EARTH AND SPACE *Multiple Choice* Which of the following sources is responsible for producing the largest volume of volcanic material?

W) Eruptions of cinder cones
X) Eruptions of composite cones
Y) Eruptions along ocean ridges
Z) Eruptions of shield volcanoes

ANSWER: Y) Eruptions along ocean ridges

TOSS-UP

23) EARTH AND SPACE *Multiple Choice* Which of the following lava types commonly form as a result of fluid basaltic flows?

W) AA flows
X) Pahoehoe (paw-hoey-hoey) flows
Y) Pyroclastic flows
Z) Lapilli flows

ANSWER: X) Pahoehoe flows

BONUS

23) EARTH AND SPACE *Short Answer* Identify all of the following three deserts that are classified as rain shadow deserts: 1 - Mojave Desert, 2 - Black Rock Desert, 3 - Sonoran Desert

ANSWER: 1, 2, 3 (In any order) OR All of them