Earth & Space Science
MCAS REVIEW

Multiple Choice - Write the letter of the choice that best completes the statement in the space provided.

1. _____ Which of the following **most likely** causes Earth's inner core to be a solid?

a. The pressure at the core is very high.
b. The metals in the core are very heavy.
c. The temperature of the core is very low.
d. The chemicals in the core are very reactive.

2. _____ A layer of solid brittle rock comprises the outer 100 kilometers of Earth. This layer, which contains **both** the crust and the upper mantle, is called the

a. core
b. sediment
c. lithosphere
d. hemisphere

3. _____ Which of the following Earth layers has the **greatest** density?

a. crust
b. mantle
c. inner core
d. outer core

4. _____ Heat energy from the Sun is transferred to Earth primarily by which of the following processes?

a. conduction
b. convection
c. evaporation
d. radiation

5. _____ Heat from deep in Earth's interior is transferred to its crust by which of the following?

a. conduction in the ocean
b. convection in the mantle
c. radiation from the solid core
d. evaporation at mid-ocean ridges

6. _____ When air near the ground is warmed by sunlight, which of the following occurs?

a. The warm air radiates and becomes cool again.
b. The warm air evaporates into the cooler air.
c. The warm air expands and rises, resulting in convection.
d. The warm air loses its ability to hold water and precipitates.

7. _____ Harmful ultraviolet rays from the Sun are **primarily** absorbed by

a. dust
b. ozone
c. land masses
d. water vapor

8. _____ What is the primary energy source that drives all weather events, including precipitation, hurricanes and tornadoes?

a. the Sun
b. the Moon
c. Earth's gravity
d. Earth's rotation

9. _____ Which of the following is the **main** reason water at the surface of the ocean is warmer than water at the bottom of the ocean?

a. Water at the bottom of the ocean contains more dissolved solids.
b. Water at the surface of the ocean absorbs more energy from the Sun.
c. Friction is created by fast moving currents at the surface of the ocean.
d. Wave action transfers heat from the bottom of the ocean to the surface.

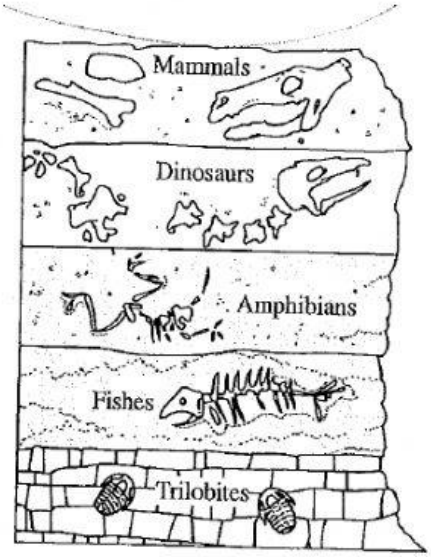
10. _____ The ocean water near the equator absorbs more heat throughout the year than ocean water near the North Pole. Which of the following **best** explains this difference?

a. The equator is closer to the Sun.
b. The equator has higher sea levels.
c. The equator receives more direct sunlight.
d. The equator rotates more quickly on Earth's axis.

11. _____ Scientists found evidence of past glacial activity in Massachusetts. Which of the following conclusions is **best** supported by this evidence?

a. Sea levels were much higher in the past.
b. The climate on Earth has changed over time.
c. Total numbers of organisms on Earth have changed over time.
d. The total amount of radiation from the Sun was much higher in the past.

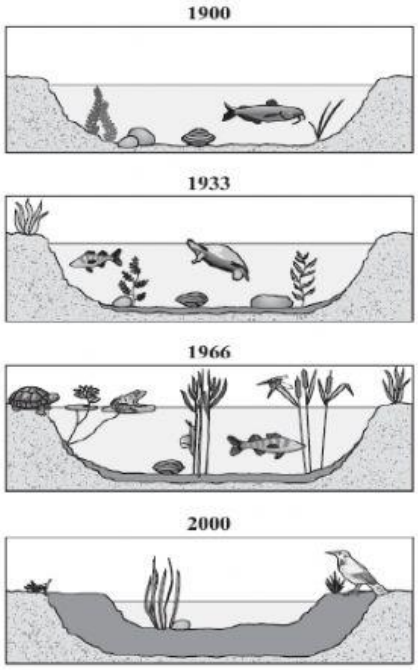
12. _____ The diagram below represents a cross-section of a cliff. It shows several rock layers containing fossils.



Which of the following layers or rock is **most likely** the youngest?

a. the layer containing trilobites
b. the layer containing fishes
c. the layer containing amphibians
d. the layer containing dinosaurs

13. _____ The four pictures below show how a pond environment changed from 1900 to 2000.



Which of the following processes was **most directly** responsible for the changes that occurred in the pond environment?

a. freezing
b. evaporation
c. sediment deposition
d. chemical weathering

14. _____ A researcher found shark fossils on top of a mountain. This evidence suggest which of the following about this region?

a. It was once below a waterfall.
b. It was once part of a riverbed.
c. It was once covered by an ocean.
d. It was once near a freshwater lake.

15. _____ Which of the following provides the **best** evidence that Earth has evolved over geologic time?

a. coral reefs that slowly changed size
b. desert sand dunes that were shaped by winds
c. deposit of sediment found at the mouth of a river
d. rock containing fossilized seashells found on a mountaintop

16. _____ The pull of gravity on Earth is a direct result of the

a. mass of Earth.
b. magnetic field of Earth.
c. rotation of Earth on its axis.
d. weight of Earth's atmosphere.

17. _____ Which of the following statements BEST describes the role of gravity in the formation of stars?

a. Gravity converts solid matter into gases and light energy.
b. Gravity causes gases and dust particles to condense into spheres.
c. Gravity cools gases and liquids until they become one solid mass.
d. Gravity pushes rocks and dust particles outward from a dense center.

18. _____ Which of the following keeps the planets in our solar system in orbit around the Sun?

a. atmospheric pressure
b. gravitational force
c. electromagnetic
d. thermal energy

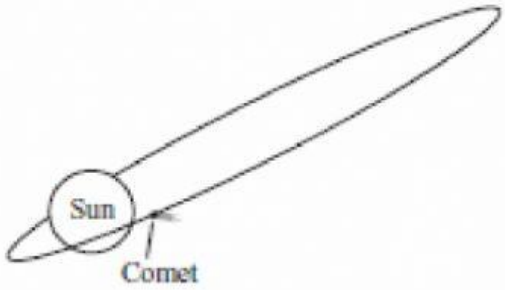
19. _____ The moon orbits Earth at a speed of approximately one kilometer per second. The moon is kept in orbit by which of the following?

a. gravity
b. lunar phases
c. magnetism
d. ocean tides

20. _____ Which of the following causes a ship's iron anchor to sink to the ocean floor when it is released overboard?

a. chemical forces
b. gravity
c. magnetism
d. nuclear forces

21. _____ The diagram below shows the orbit of a comet around the Sun. The comet travels more quickly in its orbit when it is closer to the Sun.

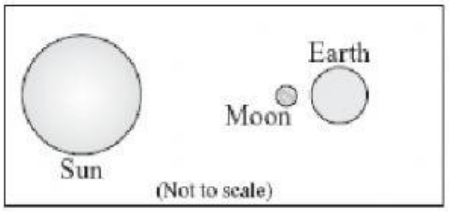


Which of the following statements **best** explains why the comet travels more quickly when it is closer to the Sun?

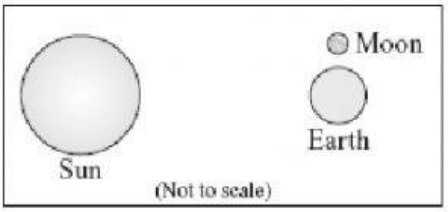
a. The mass of the comet increases.
b. The temperature of the comet increases.
c. The frictional force of the comet increases.
d. The gravitational pull on the comet increases.

22. ____ Which of the following diagrams **best** shows the relative positions of Earth, the Moon and the Sun during a lunar eclipse?

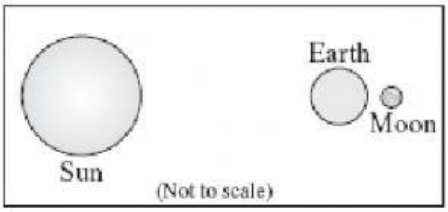
A.



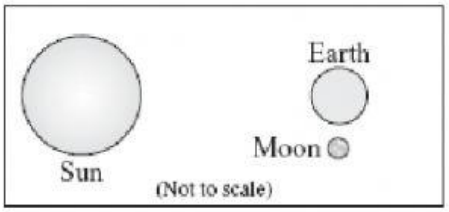
B.



C.

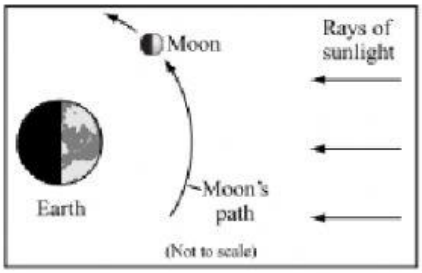


D.



a. Diagram A
b. Diagram B
c. Diagram C
d. Diagram D

23. _____ The diagram below shows the relative positions of Earth and the Moon and rays of sunlight



Based on the diagram, which of the following **best** represents how the Moon would appear as seen from Earth.

A. B. C. D.

a. Diagram A
b. Diagram B
c. Diagram C
d. Diagram D

24. _____ Miriam notices when she goes to the beach that sometimes the water rises as high as the pier. At other times of the day, the water barely covers the pillars under the pier. These differences in water level are **primarily** due to the gravitational influence of which of the following?

a. the Sun
b. the Moon
c. asteroids
d. comets

25. _____ About how many Earth days does it take the Moon to travel around Earth?

a. 1
b. 27
c. 180
d. 365

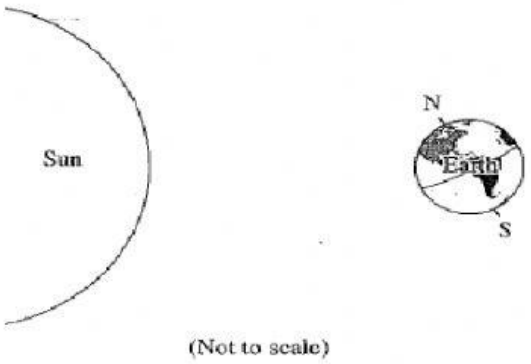
26. _____ Which of the following statements **best** describes how the four planets closest to the Sun are different from the next four planets in our solar system?

a. The four closest planets are more dense.
b. The four closest planets have more moons.
c. The four closest planets have greater diameters.
d. The four closest planets take longer to complete one orbit.

27. _____ Which of the following planets is **always** closer to the Sun than it is to Earth?

a. Jupiter
b. Mercury
c. Saturn
d. Uranus

28. _____ The illustration below shows Earth and the Sun



(Not to scale)

What season does the Southern Hemisphere experience when Earth and the Sun are in the positions shown?

a. fall
b. spring
c. summer
d. winter

29. _____ Which of the following statements **best** explains why it is warmer at the equator than at the North Pole?

a. The equator has a larger area than the North Pole.
b. The equator is closer to the Sun than the North Pole.
c. The equator receives more direct sunlight than the North Pole.
d. The equator has more hours of daylight per year than the North Pole.

30. _____ The winter solstice occurs on either December 21 or 22, depending on the year. Which of the following statements **best** explains why the time of the year the winter solstice occurs has the least amount of daylight in Massachusetts?

a. Earth is farthest away from the Sun on the winter solstice.
b. Earth's rotational speed on its axis is greatest on the winter solstice.
c. Earth is traveling around the Sun with the greatest speed on the winter solstice.
d. Earth's Northern Hemisphere is tilted away from the Sun on the winter solstice.