

Jerusalem Science Contest 2020/21 - 5781 חדרון המדה הירושלמי

Astronomy

Test 3

Name: _____

Date: _____

Proctor for this Test: _____

Form: _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) The magnetosphere prevents bombardment of the Earth by
 - A) charged particles.
 - B) meteors.
 - C) infrared radiation.
 - D) high frequency radiation.

- 2) Which features on the Moon are thought to be the result of ancient lava flows?
 - A) Craters
 - B) Aitken Basin
 - C) Highlands
 - D) Maria

- 3) Which theory of the formation of the Moon is best supported by current evidence?
 - A) Capture theory
 - B) Giant-impact theory
 - C) Fission theory
 - D) Condensation theory

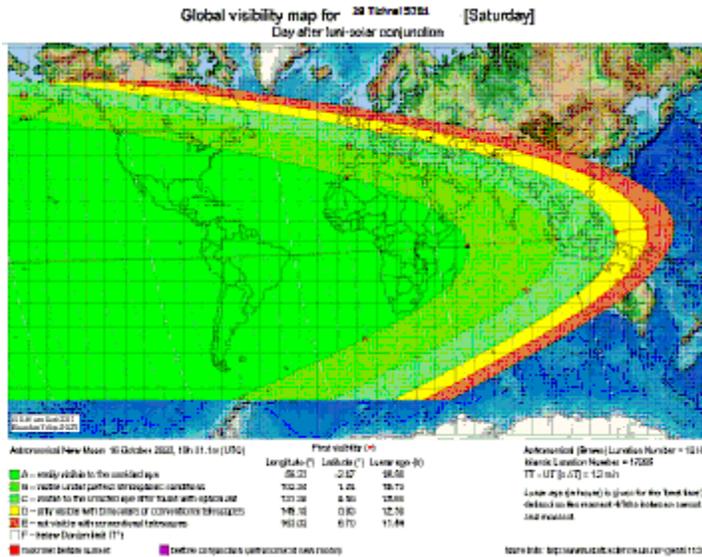
- 4) Neap tides are the smallest daily tides and occur
 - A) only in the spring.
 - B) when the Moon is between the Earth and the Sun, and all three are lined up.
 - C) when the Earth and Moon line up perpendicularly to the line from the Earth to the Sun.
 - D) when the Earth is between the Moon and the Sun, and all three are lined up.

- 5) Which region of the Earth's bulk structure contains the densest material?
 - A) The crust
 - B) The hydrosphere
 - C) The core
 - D) The mantle

- 6) According to Newton's law of universal gravitation, the force of gravity between two objects
- A) increases as the distance between them increases.
 - B) decreases as the inverse of the square of the distance between them decreases, but increases with the masses of the objects.
 - C) depends on the cube of the distance between them.
 - D) depends on the product of the objects' masses and velocities.
- 7) Which features are found on the near side, but not the far side, of the Moon?
- A) Highlands
 - B) Valleys
 - C) Craters
 - D) Maria
- 8) The Moon is composed largely of material similar to the mantle of the Earth, and not its core or crust. Which is the best explanation of this fact, according to our theories of Moon formation?
- A) The Earth captured a body into orbit which is similar in composition to the Earth's mantle, as there are many such bodies in the Solar System.
 - B) The young Earth spun off the Moon from the part that became its mantle.
 - C) A giant body collided with the Earth, breaking its crust and ejecting material from its mantle, which then condensed to form the Moon.
 - D) When an object collided with the Earth, it became coated with material from the Earth's mantle, and separated to become the Moon.
- 9) Seismic (primary) P-waves can move through
- A) only solid material.
 - B) both solid and liquid material.
 - C) only liquid material.
 - D) only the Earth's crust.
- 10) Kepler's Laws of planetary motion disagree with Copernicus's model on which point?
- A) The planets orbit around the Sun.
 - B) Retrograde motion is when a planet overtakes another planet, from the point of view of an observer on Earth.
 - C) Venus will appear as a crescent viewed from Earth during retrograde motion between us and the Sun.
 - D) The orbits are ellipses, with one focus at the Sun.
- 11) Charged particles from the solar wind enter the Earth's atmosphere near the poles, where they cause spectacular light shows known as
- A) aurorae.
 - B) nebulae.
 - C) Van Allan belts.
 - D) dynamos.

- 12) The astronomical unit (AU) is defined as
- A) the distance a point on the Earth's equator travels in one revolution, i.e. the circumference of the Earth.
 - B) the average distance from the Earth to the Sun.
 - C) the length of the semimajor axis of Earth's elliptical orbit around the Sun.
 - D) the average distance from the Sun to the furthest planet, Uranus.
- 13) What is the best explanation for the tidal locking of the Moon to the Earth?
- A) The Earth's magnetosphere caused a type of "friction" with the Moon until it slowed its orbital to become tidally locked.
 - B) Since the Moon was ejected from the young Earth, it has always moved with its rotational and orbital speed being identical, which means it is tidally locked.
 - C) The rotation of the Moon on its axis was slowed down as it was bombarded with meteors, until it reached the current, tidally-locked speed.
 - D) Gravitational attraction of the Earth on the Moon led to tidal bulging, which decreased the energy available for the Moon's rotation, so that it slowed until it was tidally locked.
- 14) According to Kepler's third law, the square of the planet's period in years is
- A) equal to the square of its aphelion distance in AU.
 - B) inversely proportional to its mass in kilograms.
 - C) proportional to the cube of its semimajor axis. in AU.
 - D) equal to its perihelion distance from the Sun in AU.
- 15) How does the Earth's ozone layer help contribute to making advanced life on Earth possible?
- A) It traps oxygen gas in the atmosphere, allowing us to breathe.
 - B) It regulates convection, which means that the weather we experience is not too extreme.
 - C) It absorbs harmful high frequency radiation.
 - D) It traps infrared radiation, heating the planet's average temperature above the freezing point of water.

16) Based upon this Yallop map of 29 Tishrei 5781, would the Sanhedrin convene on 30 Tishrei 5781 waiting for New Moon witnesses?



- A) The Sanhedrin will convene
- B) The Sanhedrin will not convene.
- C) Only if the witnesses are arriving from northern Egypt
- D) Not enough information

17) Based upon the information in this chart, when is the best New Moon viewing time in Jerusalem on November 16, 2020?



- A) 16:54:45
- B) Not enough information
- C) 17:10:31
- D) 16:40:00

18) You are the chairman of the Sanhedrin Kiddush Hachodesh committee in Jerusalem. It's midnight and you are going to sleep after a great Chanuka party where you lit the 6th candle. Your cousin in New York calls you excited and says that he just got a great view of the New Moon crescent. The call took place at 16:50 New York time. You have the following information available. What is your most likely answer to your cousin?



- A) I really don't have enough information to tell you what to do!
 - B) Get to the Sanhedrin tomorrow before sunset; We will find out whether you really saw the new moon or not.
 - C) Just another one of your bad jokes. You did not see the new moon. Save your money and stay home.
 - D) Hey Hey, you saw the new moon! Get to the Sanhedrin before sunset tomorrow if you can.
- 19) We know that digital signals move at the speed of light. Conceivably, the Sanhedrin today could inform the world of Rosh Chodesh digitally. Is there any classical Judaic source that allows the Rosh Chodesh information to be communicated from the Sanhedrin at the speed of light?
- A) The horseback riders bearing the Rosh Chodesh information was the fastest form of communication that the Sanhedrin had.
 - B) Because the Mishnah does not speak of cabled communication, one can infer that wireless communication was employed.
 - C) The large bonfires lit at the tops of mountains communicated the Rosh Chodesh information at the speed of light.
 - D) There is no classical Judaic source that promotes communication at the speed of light.

- 20) The most likely time for the New Moon crescent to be seen occurs:
- A) 16 days before a lunar eclipse.
 - B) 16 to 18 hours after the lunar-solar conjunction.
 - C) At a solar eclipse.
 - D) 10 to 14 hours after the lunar-solar conjunction.

Answer Key

Testname:

- 1) A
ID: USER-65
- 2) D
ID: USER-53
- 3) B
ID: USER-51
- 4) C
ID: USER-66
- 5) C
ID: USER-59
- 6) B
ID: USER-57
- 7) D
ID: USER-63
- 8) C
ID: USER-52
- 9) B
ID: USER-61
- 10) D
ID: USER-55
- 11) A
ID: USER-64
- 12) C
ID: USER-58
- 13) D
ID: USER-60
- 14) C
ID: USER-56
- 15) C
ID: USER-62
- 16) A
ID: USER-51
- 17) C
ID: USER-52
- 18) B
ID: USER-53
- 19) C
ID: USER-54
- 20) B
ID: USER-55

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