

Jerusalem Science Contest 2020/21 - 5781 חדרון המדה הירושלמי

Astronomy

Test 5

Name: _____

Date: _____

Proctor for this Test: _____

Form: _____

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

- 1) Comets are composed of
 - A) heavy metals
 - B) rocky material
 - C) iron oxide
 - D) ices of methane, ammonia, and water

- 2) Which of the following are by-products of the proton-proton chain reactions occurring in the Sun?
 - A) Neutrinos
 - B) Protons
 - C) Neutrons
 - D) Electrons

- 3) A coronagraph can be used to detect exoplanets by
 - A) measuring the transit time of the exoplanet across the star.
 - B) "subtracting out" the light from the stars they orbit.
 - C) detecting a "wobble" in their radial velocity via the Doppler shift.
 - D) measuring the change in light intensity caused by the exoplanet transiting across the star.

- 4) Protons need to travel at huge speeds in order to collide with one another since
 - A) they emit neutrinos, which tend to keep them apart.
 - B) their kinetic energies are extremely high, making collisions unfavorable
 - C) their magnetic fields are so great that they tend to keep them apart.
 - D) their positive charges repel each other.

- 5) In describing formation of planetary rings, the Roche limit is a critical distance, inside of which
 - A) rings cannot exist.
 - B) the planets magnetic field causes debris to collect into rings.
 - C) any moon will be torn apart.
 - D) asteroids are swept up by the planet's gravity to form rings.

- 6) Which feature of the Sun consists of objects which are always in pairs and have magnetic polarity?
- A) Spicules
 - B) Sunspots
 - C) The chromosphere
 - D) The solar wind
- 7) The transit method of detecting exoplanets will not work for all planetary systems, since
- A) many stars are so far away that the transit has a negligible effect on the light as viewed from earth.
 - B) the planet's orbit has to be oriented so that the transit occurs with the Earth, the star and exoplanet roughly lined up.
 - C) many star's velocity relative to Earth is too great.
 - D) many stars are too bright for planets to be detected.
- 8) The solar wind consists mainly of
- A) electrons and protons.
 - B) neutrons.
 - C) gamma radiation.
 - D) photons and neutrinos.
- 9) The Oort cloud is believed to be composed mainly of
- A) meteors
 - B) comets
 - C) asteroids
 - D) hydrogen, helium, and other gases
- 10) Sunspots are
- A) holes in the Sun's surface left by coronal mass ejections.
 - B) extremely hot, but colder than the neighboring regions of the Sun.
 - C) hotter than the rest of the Sun's surface.
 - D) very dark bodies on the surface of the Sun.
- 11) What is the reason certain Jupiter-sized exoplanets are called "hot Jupiters"?
- A) Chemical reactions ignite their gases, causing them to burn
 - B) They are bombarded with comets and asteroids, which heats them up
 - C) They have a lot of volcanic activity
 - D) They orbit very close to their stars
- 12) What is the second most common element in the Sun?
- A) Oxygen
 - B) Hydrogen
 - C) Iron
 - D) Helium

- 13) Which is the primary reaction occurring at the heart of the Sun?
- A) Hydrogen is fused into helium
 - B) Helium is split into hydrogen
 - C) Helium is fused into heavier nuclei
 - D) Hydrogen is fused to produce deuterium and positrons
- 14) What is the name given to violently explosive events which release huge amounts of energy near the Sun's active regions?
- A) Coronal mass ejections
 - B) Prominences
 - C) Flares
 - D) Sunspots
- 15) The Doppler method of detecting exoplanets observes wobbles in a star's radial velocity. What is radial velocity?
- A) The velocity of the star in a direction perpendicular to the straight line between the star and Earth
 - B) The velocity of the star along a radius from the center of the Milky Way
 - C) The velocity of the star either in the direction towards or away from the exoplanet
 - D) The velocity of the star either in the direction towards or away from Earth
- 16) The coordinates of the Chabad of Honolulu are N 21.288160, W157.829450. The coordinates of The Royal Observatory in Greenwich, England are: N 51.475811, E 0.000950. The coordinates of the Western Wall, Jerusalem are: N 31.776754, E 35.234383. Which of the following statements are true regarding the opinions of Rabbi Karlevitz (Chazon Ish) and Tukichinsky concerning a specific Yom Kippur and the day of the week upon which that Yom Kippur is observed in Honolulu.
- A) Both agree that Yom Kippur in Honolulu begins prior to its beginning in Israel.
 - B) One requires that Yom Kippur in Honolulu begins prior to its beginning in Israel; the other requires that Yom Kippur in Honolulu begins after its beginning in Israel.
 - C) Both agree that Yom Kippur in Honolulu begins after to its beginning in Israel.
 - D) The question contains insufficient information for response.
- 17) The coordinates of The Royal Observatory in Greenwich, England are: N 51.475811, E 0.000950. The coordinates of the Western Wall, Jerusalem are: N 31.776754, E 35.234383. The coordinates of the Chabad of Tokyo, Japan are: N 35.639761, E 139.736323. According to Rabbi Isser Zaman Meltzer, at what longitude is the halachik date line placed?
- A) Every traveller considers the longitude through his or her home town as Prime meridian and measures 180 degrees east and west of that longitude. The resulting longitude is that person's personal halachik dateline.
 - B) Exactly 180 degrees east of Greenwich, England, with no exceptions from North to South.
 - C) Exactly 180 degrees east of Jerusalem, Israel, with no exceptions from North to South.
 - D) Exactly where the world consensus places it.

- 18) The coordinates of The Royal Observatory in Greenwich, England are: N 51.475811, E 0.000950. The coordinates of the Western Wall, Jerusalem are: N 31.776754, E 35.234383. The coordinates of the Chabad of Anchorage, Alaska are N 61.189730, W 149.861020. The coordinates of Los Angeles are N 34.047511, W 118.253798. The coordinates of Boston are N 42.251291, W 71.035400
- A) If a Greenwich prime meridian and its associated date line divide the Earth into two equal hemisphere's, then one would have to say that a Jew in Anchorage would observe Shabbat on a different day of the same week than a Jew in Los Angeles.
 - B) If a Jerusalem prime meridian and its associated date line divide the Earth into two unequal sections, with a 90 degree arc east of Jerusalem and a 270 degree arc to its west, then one would have to say that a Jew in Anchorage would observe Shabbat on a different day of the same week than a Jew in Boston.
 - C) If a Jerusalem prime meridian and its associated date line divide the Earth into two unequal sections, with a 90 degree arc west of Jerusalem and a 270 degree arc to its east, then one would have to say that a Jew in Anchorage would observe Shabbat on a different day of the same week than a Jew in Boston.
 - D) If a Jerusalem prime meridian and its associated date line divide the Earth into two equal hemisphere's, then one would have to say that a Jew in Anchorage would observe Shabbat on a different day of the same week than a Jew in Los Angeles.
- 19) Jerusalem is the Prime Meridian. The coordinates of The Royal Observatory in Greenwich, England are: N 51.475811, E 0.000950. The coordinates of the Western Wall, Jerusalem are: N 31.776754, E 35.234383. The coordinates of the Chabad of Anchorage, Alaska are N 61.189730, W 149.861020. The coordinates of Los Angeles are N 34.047511, W 118.253798. The coordinates of Boston are N 42.251291, W 71.035400
- A) According to Rabbi Karelitz (Chazon Ish), The Royal Observatory, Anchorage, Los Angeles and Boston are all west of Jerusalem. Rabbi Tukinchinsky disagrees with R. Karelitz disagrees only about Anchorage.
 - B) According to Rabbi Karelitz (Chazon Ish), The Royal Observatory, Anchorage, Los Angeles and Boston are all west of Jerusalem. Rabbi Tukinchinsky disagrees with R. Karelitz only about Boston.
 - C) According to Rabbi Tukichinsky, Anchorage and Los Angeles are east of Jerusalem; the Royal Observatory and Boston are west of Jerusalem. R. Karelitz disagrees only about Los Angeles.
 - D) According to Rabbi Chaim Zimmerman, The Royal Observatory, Anchorage, Los Angeles and Boston are all west of Jerusalem. Rabbi's Tukinchinsky and Karelitz disagree with R. Zimmerman only about Boston.

20) About what items do Rabbis Karelitz (Chazon Ish) and Rabbi Chaim Zimmerman agree and disagree?

- A) Both agree that the halachik dateline is to be placed 90 degrees east of Jerusalem. They disagree as whether the date line should transverse a land mass.
- B) Both rabbis are in complete agreement concerning every issue of halachik dateline except one. Rabbi Karelitz places the date line 90 degrees east of Jerusalem while Rabbi Zimmerman places it 270 degrees west of Jerusalem.
- C) Both agree that the date line may not transverse a land mass. One says that it is placed 90 degrees east of Jerusalem and the other says that it is placed 90 degrees east of Greenwich.
- D) Both agree that the halachik date line may trasverse a land mass. One says that the date line is placed 90 degrees east of Jerusalem. The other says that it is placed 90 degrees west of Jerusalem.

Answer Key

Testname: JSC 5781 LEC 05 TEST SCIENCE AND JUDAICA

- 1) B
ID: USER-84
- 2) A
ID: USER-80
- 3) B
ID: USER-70
- 4) D
ID: USER-81
- 5) C
ID: USER-73
- 6) B
ID: USER-77
- 7) B
ID: USER-71
- 8) A
ID: USER-76
- 9) B
ID: USER-74
- 10) B
ID: USER-82
- 11) D
ID: USER-83
- 12) D
ID: USER-75
- 13) A
ID: USER-79
- 14) C
ID: USER-78
- 15) D
ID: USER-72
- 16) B
ID: USER-61
- 17) D
ID: USER-62
- 18) D
ID: USER-63
- 19) A
ID: USER-64
- 20) A
ID: USER-65

Jerusalem Science Contest 2020/21 - 5781 חדרון המדה הירושלמי

Astronomy

Test 5

Name: _____

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Form: _____

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