BROCK UNIVERSITY

Test 1: Spring 2018
Course: ASTR 1P01, Section 1
Examination date: 12 May 2018
Time of Examination: 13:00 – 13:50

Number of pages: 10
Number of students: 598
Time limit: 50 min
Instructor: S. D'Agostino

Answer all questions on the scantron sheet provided. No aids permitted except for a non-programmable calculator. Each question is worth 1 mark. Total number of marks: 50.

1. It takes light approximately _____ to travel from the Sun to Neptune.
   (a) 4 seconds
   (b) 4 minutes
   (c) * 4 hours
   (d) 4 months
2. An astronomical unit
   (a) is much larger than a light-year.
   (b) is about the same size as a light-year.
   (c) * is much smaller than a light-year.
   (d) can't be compared to a light-year, because one is a unit of distance and the other is a unit of time.
3. The Milky Way galaxy is
   (a) smaller than our solar system.
   (b) about the same size as our solar system.
   (c) about ten times as large as our solar system.
   (d) about one thousand times as large as our solar system.
   (e) * [None of the above.]
4. Stars in the Milky Way galaxy are separated from one another by an average of about
   (a) a few AU.
   (b) a few thousand AU
   (c) * a few light-years.
   (d) a few thousand light-years.

5. The planet Saturn is
   (a) closer to the Sun than the Earth.
   (b) about the same distance from the Sun as the Earth.
   (c) * farther from the Sun than the Earth.
   (d) [Saturn is not a planet in the solar system.]
6. The diameter of the Sun is about _____ the diameter of the Earth.
   (a) 10
   (b) * 100
   (c) 1,000
   (d) 10,000
7. Neptune is
   (a) a dwarf planet.
   (b) a planetesimal.
   (c) a Kuiper belt object.
   (d) * a planet.
   (e) [None of the above.]
8. The temperature of interstellar space was first determined by
   (a) Andrei Gromyko.
   (b) Andy Kaufman.
   (c) * Andrew McKellar.
   (d) André Rieu.
9. As observed from above the North Pole, the Earth rotates
   (a) from east to west (clockwise).
   (b) * from west to east (counter-clockwise).
   (c) from north to south (clockwise).
   (d) from south to north (counter-clockwise).
10. The radius of the Earth is about
   (a) * 6,400 km.
   (b) 6,400,000 km.
   (c) 6,400,000,000 km.
   (d) 6,400,000,000,000 km.

11. The distance from the Earth to the Moon is about
    (a) 400 km.
    (b) * 400,000 km.
    (c) 400,000,000 km.
    (d) 400,000,000,000 km.
12. The universe is believed to have an age of about
    (a) 14 thousand years.
    (b) 14 million years.
    (c) * 14 billion years.
    (d) 14 trillion years.
13. The planets change their positions relative to the stars because
    (a) of the rotation of the Earth.
    (b) of the Sun's motion along the ecliptic.
    (c) of the gravitational attraction between the planets.
    (d) * planets move in their orbits around the sun.
14. There are hundreds of billions of stars in
    (a) a typical binary star system.
    (b) a typical globular star cluster.
    (c) a typical cosmic filament.
    (d) * the Milky Way galaxy.
    (e) [All of the above.]
15. Stars in the Milky Way are typically organized into
    (a) astrological grand trines.
    (b) alpacan asterisms.
    (c) celestial houses.
    (d) * clusters.
16. If the entire history of the universe were compressed into a year, with the Big Bang occurring on 1 January and the present moment being midnight on 31 December, then all of recorded history took place
    (a) during the entire month of December.
    (b) during the last half of December.
    (c) during the entire day of 31 December.
    (d) * during the last 30 seconds of 31 December.

17. The distance between the Sun and the star closest to the Sun is about

    (a) * 4 light years.
    (b) 4 thousand light years.
    (c) 4 million light years.
    (d) 4 billion light years.

18. The diameter of the visible disk of the Milky Way is about

    (a) 100 AU.
    (b) 100,000 AU.
    (c) 100 light years.
    (d) * 100,000 light years.

19. A constellation is

    (a) a collection of galaxies that are close together in space.
    (b) a collection of galaxies that appear close together in the sky.
    (c) a collection of stars that are close together in space.
    (d) * a collection of stars that appear close together in the sky.

20. The Moon rises approximately in the _____ and sets approximately in the _____ .

    (a) * east, west
    (b) west, east
    (c) north, south
    (d) south, north

21. In their daily motions, stars rise in the _____ and set in the _____ .

    (a) * east, west
    (b) west, east
    (c) north, south
    (d) south, north

22. At a particular viewing location on Earth, a circumpolar star is a star

    (a) that has been named by ancient people after polar bears and other polar creatures.
    (b) that emits polarized light.
    (c) * that never rises or sets.
    (d) that is about half-way between the north pole and the south pole.

23. A star rose tonight at 11:00 pm. At the same viewing location, tomorrow it will rise at about

    (a) 11:50 pm.
    (b) 10:10 pm.
    (c) 11:04 pm.
    (d) * 10:56 pm.

24. The ecliptic is

    (a) a type of illegal hit on kick returns.
    (b) the location in space where eclipses occur.
    (c) the location in space where the zodiac intersects with the horizon.
    (d) * the imaginary line on the celestial sphere where the plane of the Earth's orbit intersects it.

25. The Earth's North Pole is tipped most closely towards the Sun on

    (a) the vernal equinox, which occurs on about March 20th.
    (b) * the summer solstice, which occurs on about June 21st.
    (c) the autumnal equinox, which occurs on about September 22nd.
    (d) the winter solstice, which occurs on about December 21st.

26. The names of constellations in English are typically derived from

    (a) Arabic.
    (b) Farsi.
    (c) Hindi.
    (d) * Greek or Latin.

27. At the equinoxes, the Sun rises in St. Catharines

    (a) * directly in the east.
    (b) a little north of east.
    (c) a little south of east.
    (d) directly in the west.

28. At summer solstices, the number of hours between sunrise and sunset in St. Catharines is

    (a) less than 12.
    (b) exactly 12.
    (c) * more than 12.

29. In St. Catharines, after the summer solstice and before fall equinox, the Sun rises a little farther _____ each day.

    (a) north of east.
    (b) * south of east.
    (c) east of north.
    (d) east of south.

30. In St. Catharines, after the spring equinox and before the summer solstice, the Sun sets a little farther _____ each day.

    (a) * north of west.
    (b) south of west.
    (c) west of north.
    (d) west of south.

31. A new moon occurs when

    (a) * the Moon lies approximately between the Earth and the Sun.
    (b) the Earth lies approximately between the Moon and the Sun.
    (c) the Sun lies approximately between the Earth and the Moon.
    (d) the Sun, Earth, and Moon form an approximate right angle.

32. The phase of the Moon is first quarter when

    (a) the Moon lies approximately between the Earth and the Sun.
    (b) the Earth lies approximately between the Moon and the Sun.
    (c) the Sun lies approximately between the Earth and the Moon.
    (d) * the Sun, Earth, and Moon form an approximate right angle.

33. The full moon rises at about

    (a) noon.
    (b) * sunset.
    (c) midnight.
    (d) sunrise.

34. The new moon rises at about

    (a) noon.
    (b) sunset.
    (c) midnight.
    (d) * sunrise.

35. The Earth's rotation axis precesses, and goes through one complete cycle in about
    (a) 26 days.
    (b) 26 years.
    (c) * 26,000 years.
    (d) 26,000,000 years.
36. When the Moon's phase is waning crescent it sets
    (a) between sunrise and mid-day.
    (b) * between mid-day and sunset.
    (c) between sunset and the middle of the night.
    (d) between the middle of the night and sunrise.
37. When the Moon's phase is waxing gibbous it sets
    (a) between sunrise and mid-day.
    (b) between mid-day and sunset.
    (c) between sunset and the middle of the night.
    (d) * between the middle of the night and sunrise.
38. When the Moon's phase is waning gibbous it rises
    (a) between sunrise and mid-day.
    (b) between mid-day and sunset.
    (c) * between sunset and the middle of the night.
    (d) between the middle of the night and sunrise.
39. When the Moon's phase is waxing crescent it sets
    (a) between sunrise and mid-day.
    (b) between mid-day and sunset.
    (c) * between sunset and the middle of the night.
    (d) between the middle of the night and sunrise.
40. The third-quarter moon sets at about
    (a) sunrise.
    (b) * mid-day.
    (c) sunset.
    (d) the middle of the night.

41. The first-quarter moon rises at about
    (a) sunrise.
    (b) * mid-day.
    (c) sunset.
    (d) the middle of the night.

42. The Earth's rotation axis is tilted relative to the plane of Earth's orbit around the Sun, which causes
    (a) the procession of the zodiac.
    (b) * the Earth's seasons.
    (c) lunar eclipses.
    (d) solar eclipses.
    (e) both lunar and solar eclipses.

43. The Earth lies directly between the Sun and the Moon
    (a) during a solar eclipse.
    (b) * during a lunar eclipse.
    (c) every day at high noon.
    (d) [None of the above.]

44. The Moon lies directly between the Sun and the Earth
    (a) * during a solar eclipse.
    (b) during a lunar eclipse.
    (c) every day at high noon.
    (d) [None of the above.]

45. A sidereal day is about _____ than a solar day.
    (a) 4 minutes longer
    (b) * 4 minutes shorter
    (c) 50 minutes longer
    (d) 50 minutes shorter

46. The day of the year that has the longest period of daylight is
    (a) the vernal (spring) equinox.
    (b) * the summer solstice.
    (c) the autumnal equinox.
    (d) the winter solstice.

47. The day of the year that has the shortest period of daylight is
    (a) the vernal (spring) equinox.
    (b) the summer solstice.
    (c) the autumnal equinox.
    (d) * the winter solstice.

48. An annular eclipse
    (a) occurs every year (annually).
    (b) occurs due to the position of the back (anterior) part of the Moon.
    (c) * does not block a ring-shaped (annulus) outside part of the Sun.
    (d) [None of the above.]

49. The Moon is still visible during a lunar eclipse because
    (a) some of the Sun's light reflected from Mars illuminates the Moon.
    (b) * the Earth's atmosphere preferentially refracts red light from the Sun that illuminates the Moon.
    (c) the Earth's magnetic field bends the path of red photons that illuminates the Moon.
    (d) [None of the above.]

50. At a particular location on the Earth, the period of totality during a total solar eclipse cannot last longer than about
    (a) 30 seconds.
    (b) 45 seconds.
    (c) 2 minutes.
    (d) * 7 minutes.