BROCK UNIVERSITY

Test 1: October 2013
Course: ASTR 1P01, Section 2
Examination date: 8 October 2013
Time of Examination: 17:00 – 17:50

Number of pages: 9
Number of students: 495
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.

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1. One trillion is

   (a) 10^6
   (b) 10^9
   (c) 10^{10}
   (d) 10^{12}

2. The result of $10^6 \div 10^2$ is equal to

   (a) 10^3
   (b) 10^4
   (c) 10^8
   (d) $106 \div 102$

3. The speed of light is about 300,000 km/s. A light year is the distance that light travels in a year. A light year is about

   (a) 10 trillion km
   (b) 10 million km
   (c) 300 thousand km
   (d) 300 million km

4. It takes light emitted by the Sun about 500 s to reach the Earth. The speed of light is about 300,000 km/s. The distance from the Sun to the Earth is about

   (a) 150 trillion km
   (b) 150 billion km
   (c) 150 thousand km
   (d) 150 million km

5. Impact craters are found on the surface of

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

6. Dense clouds completely obscure the surface of

   (a) Venus.
   (b) Mars.
   (c) Jupiter.
   (d) Saturn.

7. Huge canyons and deserts are found on the surface of

   (a) Venus.
   (b) Mars.
   (c) Jupiter.
   (d) Saturn.

8. Bright rings consisting of icy fragments circle

   (a) Saturn.
   (b) Mars.
   (c) Venus.
   (d) Mercury.

9. 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.

10. The most massive planet is

    (a) Jupiter.
    (b) Earth.
    (c) Saturn.
    (d) Uranus.

11. The least massive planet is

    (a) Mercury.
    (b) Earth.
    (c) Mars.
    (d) Pluto.

12. Most asteroids orbit the Sun between the orbits of

    (a) Venus and Earth.
    (b) Jupiter and Saturn.
    (c) Mars and Jupiter.
    (d) Neptune and Pluto.

13. A light-year is

    (a) slightly smaller than an astronomical unit (AU).
    (b) slightly larger than an astronomical unit (AU).
    (c) much smaller than an astronomical unit (AU).
    (d) much larger than an astronomical unit (AU).

14. Overall, the universe appears to be

    (a) contracting.
    (b) static.
    (c) oscillating.
    (d) expanding.

15. The planet closest to the Sun is

    (a) Venus.
    (b) Mercury.
    (c) Earth.
    (d) Pluto.

16. The Big Bang created

    (a) the stars.
    (b) the universe.
    (c) the galaxies.
    (d) the planets.

17. The Local Group refers to a collection of

    (a) stars.

    (b) planets.

    (c) galaxies.

    (d) objects in the Kuiper belt and the Oort cloud.

18. What does it mean to say that the universe is expanding?

    (a) Everything in the universe is increasing in size.

    (b) Individual galaxies are increasing in size.

    (c) The average distances between star systems within galaxies is increasing.

    (d) The average distances between galaxies is increasing.

19. You and your band of nomads are on a long journey. You notice that each evening the North Star appears to be closer to the horizon than the previous evening. You are walking

    (a) North.

    (b) South.

    (c) East.

    (d) West.

20. The Earth rotates once in 24 hours. Therefore, the sky appears to rotate [?] degrees per hour.

    (a) 10

    (b) 15

    (c) 24

    (d) 30

21. If you are standing at the Earth's North Pole at the winter solstice, the [?] is directly overhead.

    (a) the ecliptic

    (b) the nadir

    (c) the Sun

    (d) the north celestial pole

22. If you are standing at the Earth's equator at the fall equinox, then the [?] is directly overhead.

    (a) the north celestial pole
    (b) the ecliptic
    (c) the celestial equator
    (d) the nadir

23. If the Earth actually rotated in the opposite sense, then

    (a) winter in the northern hemisphere would occur in July.
    (b) the seasons would occur in the opposite order.
    (c) the Sun would rise in the west and set in the east.
    (d) [None of the above.]

24. The Sun, the Moon, and the stars all rise in the east and set in the west because

    (a) the Earth rotates from west to east.
    (b) the Earth rotates from east to west.
    (c) the Earth revolves around the Sun from west to east.
    (d) the Earth revolves around the Sun from east to west.

25. As seen from the Earth's North Pole

    (a) no visible star is a circumpolar star.
    (b) some visible stars are circumpolar and some visible stars rise and set on the horizon.
    (c) only stars visible in Winter are circumpolar stars.
    (d) all visible stars are circumpolar stars.

26. As seen from the Earth's equator

    (a) all visible stars are circumpolar stars.
    (b) some visible stars are circumpolar stars.
    (c) there are no circumpolar stars.
    (d) [It depends on the season.]

27. Suppose that the tilt of the Earth's rotation axis were to suddenly change from 23.5° to 0°. You would expect the following change:

    (a) All the seasons would be about the same.
    (b) The north pole would be warm and the equator would be cold.
    (c) Summer and winter would last six months each, and there would be no spring or fall.
    (d) The seasons would overlap to a somewhat greater degree.

28. On June 21, 2013, the number of hours of daylight at latitude 72° south was

    (a) 0.
    (b) 12.
    (c) between 0 and 12.
    (d) 24.

29. The Sun appears to travel south, then north, then south again during the year. The extreme north and south points of this apparent journey are called

    (a) solstices.
    (b) nodal points.
    (c) crossing points.
    (d) equinoxes.

30. The four seasons, Fall, Winter, Spring and Summer, are caused by

    (a) changing temperatures of the Sun.
    (b) the 23.5° tilt of the Earth's rotation axis.
    (c) the precession of the Earth's axis.
    (d) the sunspot cycle.

31. In Spring in the northern hemisphere, the Sun rises

    (a) further north each day.
    (b) further south each day.
    (c) further east each day.
    (d) further west each day.

32. In Summer in the northern hemisphere, the Sun rises

    (a) further north each day.
    (b) further south each day.
    (c) further east each day.
    (d) further west each day.

33. In Fall in the northern hemisphere, the Sun rises

    (a) further north each day.
    (b) further south each day.
    (c) further east each day.
    (d) further west each day.

34. In Winter in the northern hemisphere, the Sun rises

    (a) further north each day.
    (b) further south each day.
    (c) further east each day.
    (d) further west each day.

35. The full moon rises at about

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

36. The first quarter moon rises at about

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

37. The third quarter moon sets at about

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

38. The new moon sets at about

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

39. A waxing crescent moon rises

    (a) between sunrise and noon.
    (b) between noon and sunset.
    (c) between sunset and midnight.
    (d) between midnight and sunrise.

40. A waning crescent moon rises

    (a) between sunrise and noon.
    (b) between noon and sunset.
    (c) between sunset and midnight.
    (d) between midnight and sunrise.

41. A waxing gibbous moon rises

    (a) between sunrise and noon.
    (b) between noon and sunset.
    (c) between sunset and midnight.
    (d) between midnight and sunrise.

42. A waning gibbous moon rises

    (a) between sunrise and noon.
    (b) between noon and sunset.
    (c) between sunset and midnight.
    (d) between midnight and sunrise.

43. If the Moon's orbit were in the same plane as the Earth's orbit around the Sun, then there would be a solar eclipse

    (a) once every month.
    (b) twice every month.
    (c) once every year.
    (d) once every year, but with an extra one every leap year.

44. If the Moon's orbit were in the same plane as the Earth's orbit around the Sun, then there would be a lunar eclipse

    (a) once every month.
    (b) twice every month.
    (c) once every year.
    (d) once every year, but with an extra one every leap year.

45. The dates of solar eclipses get shifted from one year to the next because of

    (a) precession of the Earth's rotational axis.
    (b) precession of the equinoxes.
    (c) precession of the solstices.
    (d) precession of the Moon's orbit.

46. The Moon's phase at a solar eclipse is

    (a) new.
    (b) first quarter.
    (c) full.
    (d) third quarter.

47. The Moon's phase at a lunar eclipse is

    (a) new.
    (b) first quarter.
    (c) full.
    (d) third quarter.

48. When you observe a total solar eclipse, you must be in the

    (a) Earth's penumbra.
    (b) Earth's umbra.
    (c) Moon's penumbra.
    (d) Moon's umbra.

49. When you observe a partial solar eclipse, you must be in the

    (a) Earth's penumbra.
    (b) Earth's umbra.
    (c) Moon's penumbra.
    (d) Moon's umbra.

50. Eclipses can possibly occur about once every

    (a) month.
    (b) three months.
    (c) six months.
    (d) nine months.