Practice Final Exam

1. During which season in Oklahoma is the earth farthest from the sun?
(a) spring
(b) summer
(c) fall
(d) winter

2. If you see the Moon just setting (i.e. going down below the horizon) at 6am (or sunrise),
what phase is the Moon in?
(a) new moon
(b) first quarter
(c) full moon
(d) third quarter

3. The terrestrial planets were formed in the solar system
(a) under conditions of high temperature
(b) near where the comets formed
(c) in the same manner as the Jovians
(d) with original atmospheres of carbon dioxide

4. How was the solar system formed?
(a) from the collision of the sun with another star
(b) from the accretion of matter from a nearby companion star
(c) from the big bang explosion
(d) none of the above

5. If radio telescopes from the SETI project detected signals from a distant planet with gravity 3 times that of the earth's, what kind of extra-terrestrials would you expect to find?
(a) short and heavily-built humans
(b) short and heavily-built non-humans who do not have any radios
(c) tall, thin non-humans
(d) short and heavily-built non-humans

6. Which kind of star has the widest (i.e., the largest) life (or habitable) zone?
(a) B star
(b) A star
(c) F star
(d) G star

7. Communication between intelligent species in the galaxy and us would best be accomplished by
(a) sending out numerous unmanned space probes with plaques showing pictures of us
(b) sending out space colonies moving at 25,000 miles per hour
(c) using radio waves in the "water hole"
(d) using light waves with beams with encoded signals sent out from the largest optical telescopes in the world

8. The stars whose planets have the greatest chance of harboring intelligent life are
(a) O stars
(b) red giants
(c) protostars
(d) G stars

9. Why would neutrinos not be a good choice for communicating with other technical civilizations?
(a) they do not move as fast as sound waves
(b) they are hard to stop and collect
(c) their large masses (larger than that of protons) make them hard to detect
(d) they are easily scattered by interstellar dust

10. Which one of the following does NOT enter into the Drake equation?
(a) rate of star formation
(b) average length of a human life
(c) the lifetime of a technological civilization
(d) the fraction of stars having planets

11. The number of civilizations which are capable of interstellar communication and which exist in our galaxy right now is
(a) zero
(b) certainly not more than 1
(c) anywhere from 1 to 20 million
(d) more than one hundred billion

11. What do we know (at present) about planets around other stars?
(a) we have found many thousands, including some with intelligent life
(b) we have found some (hundreds), but do not know if any contain life
(c) our present technology cannot find any
(d) it will never be possible to detect planets around other stars because they are too small to see

12. Who first proposed that the earth was the center of the solar system?
(a) Aristotle
(b) Copernicus
(c) Kepler
(d) Galileo

13. Copernicus is remembered for his
(a) metal nose
(b) heliocentric theory of the solar system
(c) careful observations of Mars
(d) explanation of Kepler's second law

14. Tycho Brahe's greatest scientific achievement was his
(a) precise measurement of planetary positions
(b) discovery of the telescope
(c) interpretation of Kepler's laws
(d) Tychonic model of the solar system

15. According to Kepler's third law of planetary orbits
(a) the earth moves around the sun at a higher speed than Venus
(b) the earth moves around the sun at a slower speed than Venus
(c) the earth and Venus move at the same speed in their orbits
(d) both the earth and Venus move around the sun in elliptical orbits

16. Which of the following is not a property of the Jovian planets?
(a) rings
(b) low density
(c) slow rotation
(d) many satellites

16. If the sun is at one focus of a planetary orbit, what is at the other one?
(a) the orbiting planet
(b) a comet (e.g., like Halley's Comet)
(c) a dead, burned-out (and therefore not readily visible) star
(d) nothing

17. Which of the following was NOT an observation made by Galileo?
(a) the mountains of Venus
(b) the satellites of Jupiter
(c) the craters on the moon
(d) the many stars in the Milky Way

18. The surface of Mercury most closely resembles the surface of
(a) Jupiter
(b) the earth
(c) Venus
(d) the moon

19. The surface of Venus is much hotter than we might have expected because
(a) Venus is much closer to the sun than is earth
(b) of the volcanic action: heat from the interior of Venus comes up to the surface through volcanoes and cannot escape because of the clouds
(c) Venus rotates retrograde
(d) of the runaway Greenhouse effect due to the carbon dioxide atmosphere

20. Assuming that Venusians actually existed and that they have not built rockets, how could they investigate what is beyond the Venusian clouds? That is, how could they do astronomy?
(a) use radio telescopes
(b) use those wavelengths emitted by carbon dioxide
(c) do infrared astronomy
(d) they could not do astronomy because it is always twilight there

21. The most abundant constituents of the atmospheres of Venus, Earth, and Mars are___, ___ and ___, respectively.
(a) CO_2, N_2, and O_2
(b) CO_2, N_2, and CO_2
(c) O_2, N_2, and CO_2
(d) CO_2, O_2, and H_2O

22. The polar caps on Mars are made of
(a) water ice and dry ice
(b) methane ice
(c) ammonia ice and water ice
(d) only water ice

23. Olympus Mons (or Mount Olympus)
(a) was the name of Tycho Brahe's palace
(b) is a volcano on Mars
(c) refers to Jupiter, the greatest planet
(d) is a movement to abolish the Olympic Games

24. Which Galilean satellite may have a (liquid water) ocean and perhaps be a possible site for life in the solar system?
(a) Callisto
(b) Ganymede
(c) Europa
(d) Titan

25. Which of the following is true about asteroids?
(a) most are found in circular orbits around the sun in Kirkwoods' gaps
(b) most are as large as the moon
(c) their tails always point away from the sun
(d) they probably represent material that never collected into a planet

26. If you were sent to the moon to find some 4-1/2 billion years old rocks, where would you land your spaceship?
(a) the Sea of Tranquillity
(b) a cratered highland region
(c) on the floor of a ray crater
(d) near an impact crater in the mare material

27. Which lunar surface features best indicate past fluid flow on the lunar surface?
(a) craters
(b) rays
(c) rilles
(d) mountain ranges

28. Arrange the following features on the moon from oldest to youngest?
(a) ray craters, mare, mare basins, highlands
(b) highlands, mare basins, mare, ray craters
(c) mare basins, mare, highlands, ray craters
(d) highlands, ray craters, mare basins, mare

29. How was our moon formed?
(a) it broke off from the earth where the Pacific Ocean is today
(b) it formed as a twin-planet out of the same material and at the same time as the earth
(c) it formed in orbit from material ejected from the still forming earth
(d) it was formed elsewhere in the solar system and was captured

30. Of Jupiter's known satellites
(a) eight were discovered by Galileo
(b) the largest, Titan, has an atmosphere
(c) four can be seen with OU's telescope
(d) none has volcanoes

31. Which of the following are arranged in order of increasing rotation period? In other words, arrange them in terms of the shortest "day" to the longest "day".
(a) Earth, Venus, Uranus
(b) Neptune, Earth, Mercury
(c) Venus, Saturn, Jupiter
(d) Earth, Mercury, Mars

32. The particles in the rings of Saturn
(a) rotate at a constant speed like a compact disk
(b) extend beyond the orbit of Titan
(c) are where comets come from
(d) obey Kepler's third law

33. Saturn radiates more energy than it receives from the sun. The most likely explanation is that it
(a) is hotter than the sun
(b) is closer to the sun than we think
(c) gets the extra energy from Jupiter
(d) is slowly contracting

34. Most meteorites come from
(a) asteroids
(b) comets
(c) the moon
(d) alien spaceships

35. Arrange the following planets in terms of increasing density, lowest density to highest density
(a) the Moon, the earth, Jupiter
(b) Saturn, the Moon, the Earth
(c) the Earth, Mars, Venus
(d) Mercury, Earth, Neptune

36. The chemical composition of the solar atmosphere is most like that of
(a) the atmosphere of Jupiter
(b) the atmosphere of Mars
(c) the atmosphere of the moon
(d) the atmosphere of Mercury

37. The weakest force in nature is the
(a) EM force
(b) strong nuclear force
(c) weak nuclear force
(d) gravitational force

38. Absolute magnitude is a measure of a star's
(a) apparent brightness
(b) true brightness
(c) mass
(d) size

39. In order for an electron in an atom to make a transition from one orbit to a larger one
(a) the atom must be supplied with a certain amount of energy
(b) the atom must get rid of a certain amount of energy
(c) the atom must be entirely isolated from its surroundings
(d) the nucleus of the atom must contain at least one neutron

40. A Hydrogen atom emits red spectral lines when it changes from the third to the second energy level. When the atom changes from the fourth to the second level, it emits
(a) the same red lines
(b) infrared lines
(c) blue lines
(d) radio waves

41. An H-R diagram is a plot of
(a) luminosity vs. distance
(b) mass vs. temperature
(c) luminosity vs. temperature
(d) temperature vs. radius

42. For which type of electromagnetic radiation do the photons have the most energy?
(a) radio
(b) ultraviolet
(c) gamma ray
(d) visible (i.e. optical)

43. Large telescopes like the Keck telescope and the radio telescope at Arecibo work on the principle of
(a) reflection
(b) diffraction
(c) scattering
(d) refraction

44. Energy from nuclear fusion is produced only in a volume around the center of a star because
(a) that is where the concentration of heavy elements is
(b) that is where radioactivity is the strongest
(c) it is hot enough only near the center
(d) none of the above

45. The source of energy in the sun and the stars is mainly:
(a) nuclear energy
(b) gravitational energy
(c) electromagnetic energy
(d) chemical energy

46. The Sun is
(a) hotter than an O-type main sequence star
(b) larger than an M-type red giant
(c) larger than a white dwarf
(d) more massive than an B-type main sequence star

47. Red giants are brighter than white dwarfs because they
(a) are hotter
(b) are nearer
(c) are bigger
(d) are more massive

48. The stellar remnant (what is left at the end) of a star that is born with a mass equal to the sun is a
(a) white dwarf
(b) neutron star
(c) pulsar
(d) black hole

49. Protostars are primarly powered by (the energy comes from) from
(a) degenerate gas pressure
(b) gravity
(c) synchrotron radiation
(d) nuclear reactions

50. Pulsars are formed during
(a) supernova explosions
(b) nova explosions
(c) the formation of main sequence stars
(d) the helium flash

51. Which of these must indicate recent star formation?
(a) red giants
(b) main sequence M stars
(c) main sequence O stars
(d) white dwarfs

52. The variable stars known as Cepheids are useful
(a) in determining the masses of stars
(b) in determining the temperatures of stars
(c) in determining distances
(d) in determining ages

53. Arrange the following in terms of temperature in the Sun from lowest to highest temperature
(a) sunspots, chromosphere, inner corona, center of sun
(b)sunspots, chromosphere, center of sun, inner corona
(c) photosphere, inner corona, chromosphere, center of sun
(d) chrompshere, sunspots, inner corona, center of sun

54. The photosphere of the sun
(a) appears red in color due to the hydrogen spectral lines
(b) is the region in which sunspots occur
(c) is the outermost part of the sun
(d) has an average temperature of about 1 million degrees K

55. Consider a brave astronaut falling into a black hole. We never see him fall into the black hole because
(a) photons are trapped by the large gravity at the edge of the black hole (i.e. gravitational red shift)
(b) gravitational radiation causes an outward pressure on the astronaut preventing him from falling
(c) our clocks run too fast near the black hole to detect the astronaut
(d) x-rays streaming out from inside the black hole radiate the astronaut so we cannot see him

56. Which of the following do you expect the sun to become?
(a) nova
(b) planetary nebula
(c) supernova
(d) pulsar

57. Black holes are formed from
(a) the collapse of low-mass stars
(b) the collapse of high-mass stars
(c) the ejection of planetary nebulae
(d) the explosion of a nova

58. Star clusters are especially informative because all members (i.e. all of the stars) may be assumed to have, at least approximately, equal
(a) surface temperatures
(b) masses
(c) ages
(d) diameters

59. The Milky Way is
(a) a radio galaxy
(b) an irregular galaxy
(c) an elliptical galaxy
(d) a spiral galaxy

60. A star spends most of its lifetime
(a) fusing hydrogen into helium
(b) fusing helium into carbon
(c) fusing carbon into iron
(d) as a planetary nebula

61. Suppose quasar Sooner has a redshift of 2 and quasar Boomer has a redshift of 4. Which of the following is true?
(a) Sooner is moving at 2 times the speed of light, while Boomer is moving at 4 times the speed of light
(b) Sooner and Boomer are both moving less than, but near, the speed of light
(c) Boomer is nearer to earth than Sooner
(d) Sooner has a velocity that is exactly twice as large as Boomer

62. In our Galaxy, new stars are being formed
(a) in the halo
(b) in the globular clusters
(c) in the spiral arms, where globular clusters are located
(d) in the spiral arms, where much of the gas and dust is located

63. Most globular clusters are located in our galactic
(a) spiral arms
(b) dust lanes
(c) halo
(d) nucleus

64. Hubble's law states that
(a) the large-scale characteristics of the universe never change
(b) if one part of the universe expands, some other part must contract
(c) all galaxies are moving away from the Milky Way at equal speeds
(d) a galaxy's redshift is in proportion to the galaxy's distance from us

65. Interstellar dust particles between us and a star will cause the star to look too
(a) red
(b) blue
(c) bright
(d) nearby

66. Cygnus A is
(a) a quasar
(b) a Seyfert galaxy
(c) a radio galaxy with jets coming out of the center of the galaxy
(d) a cluster of galaxies

67. If a spaceship approaches you at a constant velocity of 99% of the speed of light, you would see its clocks running (compared with yours)
(a) fast
(b) backwards
(c) the same
(d) slow

68. Which of these objects has an absorption line spectrum?
(a) an ordinary incandescent light bulb
(b) an H II region
(c) a star
(d) the sun's chromosphere

69. Our galaxy, which is a(n) galaxy, is part of the Local Group, which, like the universe as a whole, is composed mostly of galaxies.
(a) spiral, spiral
(b) spiral, elliptical
(c) spiral, irregular
(d) elliptical, elliptical

70. Which would you NOT expect to be produced by the big bang?
(a) primordial microwave background radiation
(b) helium
(c) oxygen
(d) hydrogen