Modern Astronomy Review #1

1. The red-shift of light from distant galaxies provides evidence that the universe is
   (1) shrinking, only
   (2) expanding, only
   (3) shrinking and expanding in a cyclic pattern
   (4) remaining the same size

2. According to Hubble's Law, more rapidly moving galaxies are now
   (1) farther away from us
   (2) closer to us
   (3) decelerating slowly
   (4) already contracting toward another Big Bang

3. The Doppler Effect predicts that light from a source moving away from the Earth will be
   (1) shifted toward shorter wavelengths
   (2) shifted toward longer wavelengths
   (3) appear blue
   (4) appear red

4. Which statement describes the general relationship between the temperature and the luminosity of main sequence stars?
   (1) As temperature decreases, luminosity increases.
   (2) As temperature increases, luminosity increases.
   (3) As temperature decreases, luminosity remains the same.
   (4) As temperature increases, luminosity remains the same.

5. The Milky Way galaxy is best described as
   (1) a type of solar system
   (2) a constellation visible to everyone on Earth
   (3) a region in space between the orbits of Mars and Jupiter
   (4) a spiral-shaped formation composed of billions of stars

6. The unit used by most astronomers to express distances to other galaxies is
   (1) miles
   (2) kilometers
   (3) astronomical units (A.U.)
   (4) light years

7. By using a spectroscope to view the spectral line patterns of distant stars, astronomer can
   (1) measure the size of a star
   (2) measure the altitude of a star
   (3) identify elements in a star
   (4) measure the diameter of a star

8. Based on the red-shift data on galaxies, most astronomers infer that the universe is currently
   (1) expanding
   (2) contracting
   (3) moving randomly
   (4) fixed and stationary

9. Which of the following is thought to be true?
   (1) the Universe is older than our Solar System
   (2) the Universe and our Solar System formed at the same time
   (3) the Universe is younger than our Solar System
   (4) our Solar System is thought to be 10 billion years old

10. Compared to the distance between planets, the distance between stars is
    (1) greater (2) less (3) approximately the same

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11. The coolest stars appear
(1) white
(2) red
(3) yellow
(4) blue

12. A new star was discovered in our Milky Way galaxy that is 13 light years away. How long does it take the light from this star to reach our eyes here on Earth?
(1) 4.6 billion years
(2) 186,000 years
(3) 13 years
(4) 300,000 years

13. What could be the luminosity of a main sequence star that has a temperature of 6,000K?
(1) 1
(2) .01
(3) 100
(4) 10,000

14. Which star has the greatest size?
(1) the Sun
(2) Alpha Centauri
(3) Betelgeuse
(4) Procyon B

15. What type of star is Polaris?
(1) white dwarf
(2) supergiant
(3) giant
(4) main sequence star

16. Compared to our Sun, Polaris is
(1) brighter
(2) smaller
(3) cooler
(4) hotter

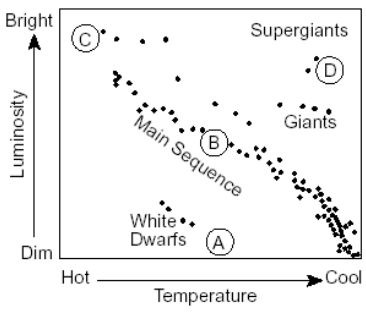
17. Which of the following is the same for all stars along a horizontal line on the H-R diagram?
(1) temperature
(2) luminosity
(3) color
(4) age

18. Two stars of the same color are plotted on an H-R diagram. Star A is more luminous than star B. Which one of the following statements could explain this?
(1) Star A is hotter than star B.
(2) Star A is more distant than star B.
(3) Star A appears dimmer in the sky than star B.
(4) Star A is larger than star B.

19. An astronomer can estimate the temperature of a star by observing its
(1) color
(2) size
(3) shape
(4) brightness

20. The graph below represents the brightness and temperature of stars visible from Earth.

Which location on the graph best represents a star with average brightness and temperature?
(1) *A*
(2) *B*
(3) *C*
(4) *D*



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21. In a Doppler red shift, the observed wavelengths of light from distant celestial objects appear closer to the red end of the spectrum than light from similar nearby celestial objects. The explanation for the red shift is that the universe is presently
(1) contracting, only
(2) expanding, only
(3) remaining constant in size
(4) alternating between contracting and expanding

22. A light-emitting object moving toward an observer will appear to the observer to be emitting waves that are
(1) blue shifted and shorter than normal
(2) blue shifted and longer than normal
(3) red shifted and shorter than normal
(4) red shifted and longer than normal

23. The velocity of a galaxy can be measured by measuring
(1) how fast its apparent size decreases
(2) how many lines occur in its spectrum
(3) the shift in the pattern of lines in its spectrum
(4) how fast it changes position in the sky

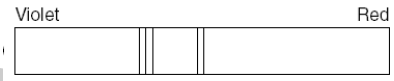
24. According to the H-R diagram, the Sun is classified as a
(1) main sequence star with a temperature of 4,000°C and a luminosity of 100.
(2) main sequence star with a temperature of 6,000°C and a luminosity of 1.
(3) white dwarf star with a temperature of 10,000°C and a luminosity of 0.01.
(4) blue supergiant star with a temperature of 20,000°C and a luminosity of 700,000.

25. The star *Algol* is estimated to have approximately the same luminosity as the star *Aldebaran* and approximately the same temperature as the star *Rigel*. *Algol* is best classified as a
(1) main sequence star
(2) red giant star
(3) white dwarf star
(4) red dwarf star

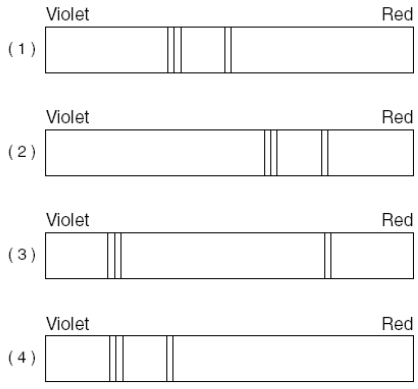
26. The explosion associated with the Big Bang theory and the formation of the universe is inferred to have occurred how many billion years ago?
(1) less than 1
(2) 2.5
(3) 4.6
(4) 13.7

27. Compared to the Sun, a white dwarf star is
(1) hotter and larger
(2) hotter and smaller
(3) cooler and larger
(4) cooler and smaller

28. The diagram below shows the spectral lines for an element.



Which diagram best represents the spectral lines of this element when its light is observed coming from a star that is moving away from Earth?



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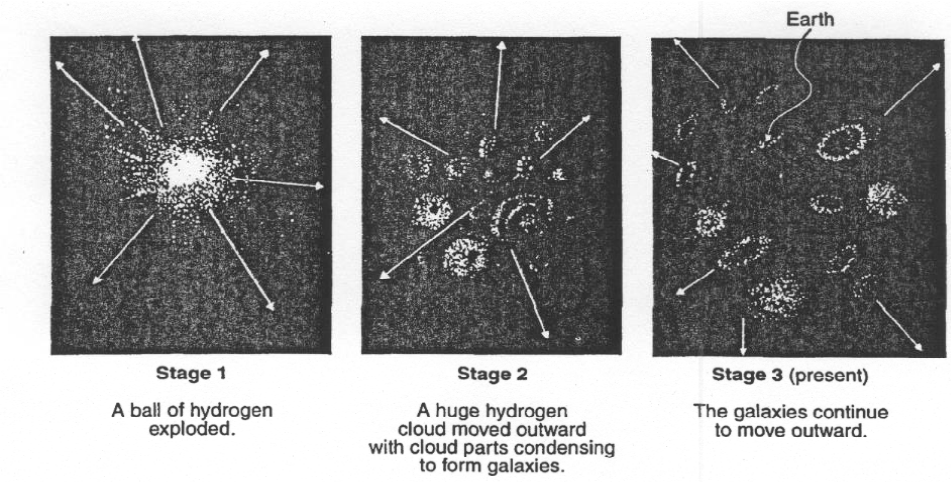
29. Compared to other stars, the Sun is
(1) among the hottest stars
(2) among the smallest star
(3) very unique
(4) about average in all respects

30. The diagram below illustrates three stages of a current theory of the formation of the universe.



A major piece of scientific evidence supporting this theory is the fact that wavelengths of light from galaxies moving away from Earth in stage 3 are observed to be
(1) shorter than normal (a red shift)
(2) shorter than normal (a blue shift)
(3) longer than normal (a red shift)
(4) longer than normal (a blue shift)

31. In which list are the celestial features correctly shown in order of decreasing size?
(1) galaxy → solar system → universe → planet
(2) solar system → galaxy → planet → universe
(3) planet → solar system → galaxy → universe
(4) universe → galaxy → solar system → planet

32. Which type of electromagnetic energy has the longest wavelength?
(1) radio waves
(2) visible light rays
(3) gamma rays
(4) UV rays

33. An asteroid is detected and is determined to be 4.2 A.U. away from Earth. How far away is that asteroid?
(1) 149.6 million km
(2) 300.0 million km
(3) 628.3 million km
(4) 953.8 million km

34. Which of the following is true of electromagnetic energy?
(1) radio waves have a shorter wavelength than infrared rays
(2) infrared waves have a longer wavelength than visible light
(3) blue light has a longer wavelength than green light
(4) ultraviolet rays and infrared waves are similar in wavelengths

35. Evidence for the Big Bang Theory is provided by
(1) cosmic background radiation found in space
(2) the composition of the rings of Saturn
(3) the spectral blue shift of 99% of galaxies observed in the Universe
(4) meteorite impact evidence on the Moon and Mercury

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