Name: _____

1) The explosion associated with the Big Bang theory and the formation of the universe is inferred to have occurred how many billion years ago?
   A) 2.5
   B) 4.6
   C) over 10
   D) less than 1

2) The Big Bang Theory, describing the creation of the universe, is most directly supported by the
   A) presence of volcanoes on Earth
   B) presence of craters on Earth's Moon
   C) red shift of light from distant galaxies
   D) apparent shape of star constellations

3) Astronomers viewing light from distant galaxies observe a shift of spectral lines toward the red end of the visible spectrum. This shift provides evidence that
   A) Earth's atmosphere is warming
   B) the Sun is cooling
   C) the universe is expanding
   D) orbital velocities of stars are decreasing

4) When viewed from Earth, the light from very distant galaxies shows a red shift. This is evidence that these distant galaxies are
   A) moving away from Earth
   B) revolving around the Sun
   C) moving toward Earth
   D) revolving around the Milky Way

5) Which process produces the energy that allows the stars of the universe to radiate visible light?
   A) insolation
   B) radioactive decay
   C) convection
   D) nuclear fusion

6) Compared to the surface temperature and luminosity of massive stars in the Main Sequence, the smaller stars in the Main Sequence are
   A) cooler and less luminous
   B) hotter and more luminous
   C) cooler and more luminous
   D) hotter and less luminous

7) Compared to the temperature and luminosity of the star *Polaris*, the star *Sirius* is
   A) hotter and more luminous
   B) cooler and less luminous
   C) cooler and more luminous
   D) hotter and less luminous

8) Compared with our Sun, the star *Betelgeuse* is
   A) larger, cooler, and more luminous
   B) larger, hotter, and less luminous
   C) smaller, hotter, and less luminous
   D) smaller, cooler, and more luminous

9) Which list shows stars in order of increasing temperature?
   A) *Rigel, Polaris, Aldebaran, Barnard's Star*
   B) *Procyon B, Alpha Centauri, Polaris, Betelgeuse*
   C) *Aldebaran*, the Sun, *Rigel, Procyon B*
   D) *Barnard's Star, Polaris, Sirius, Rigel*

10) Compared to the Jovian planets in our solar system, Earth is
   A) less dense and farther from the Sun
   B) more dense and farther from the Sun
   C) more dense and closer to the Sun
   D) less dense and closer to the Sun

11) Which object in our solar system has the *greatest* density?
   A) Earth
   B) the Sun
   C) Jupiter
   D) the Moon

12) Which planet is located approximately ten times farther from the Sun than Earth is from the Sun?
   A) Uranus
   B) Jupiter
   C) Saturn
   D) Mars

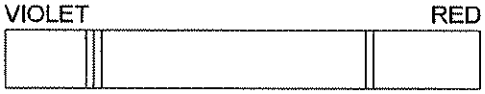
13) State *one* piece of evidence used by scientists to support the theory that the Big Bang event occurred.

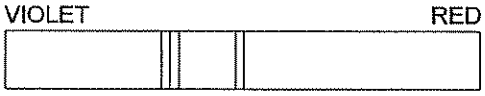
14) Identify the color of the star *Bellatrix* which has a surface temperature of approximately 21,000°C.

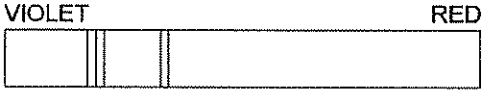
15) The diagram below shows the spectral lines for an element.

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?

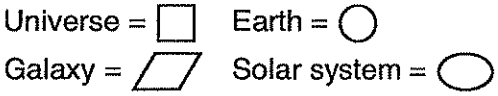
A)


B)


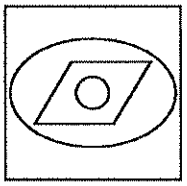
C)


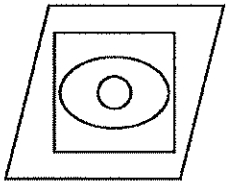
D)


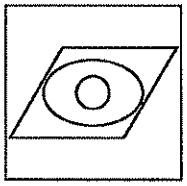
16) The symbols below are used to represent different regions of space.

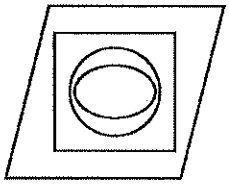


Which diagram shows the correct relationship between these four regions? [*If one symbol is within another symbol, that means it is part of, or included in, that symbol.*]

A)


B)


C)


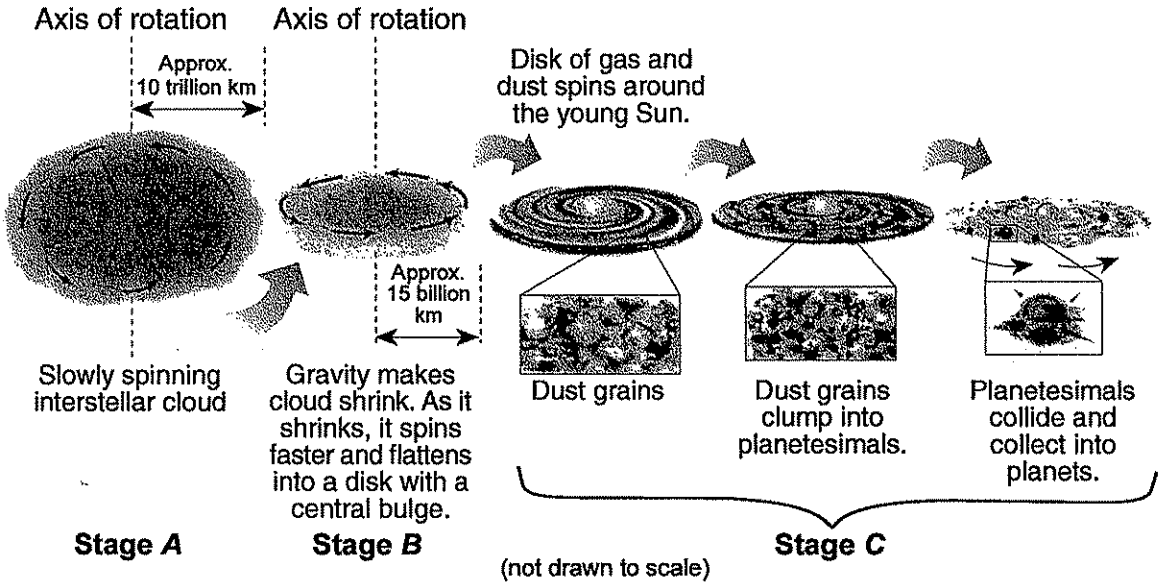
D)


17) Complete the table below by identifying the color and classification of the star *Procyon B*. The data for the Sun have been completed as an example.

Star	Color	Classification
Sun	yellow	main sequence
Procyon B		

Questions 18 and 19 refer to the following:

The diagram below shows an inferred sequence in which our solar system formed from a giant interstellar cloud of gas and debris. Stage *A* shows the collapse of the gas cloud, stage *B* shows its flattening, and stage *C* shows the sequence that led to the formation of planets.



18) From stage *B* to stage *C* in the given diagram, the young Sun was created

A) by outgassing from the spinning interstellar cloud
B) when gravity caused the center of the cloud to contract
C) by outgassing from Earth's interior
D) when gravity caused heavy dust particles to split apart

19) After the young Sun shown in the given diagram formed, the disk of gas and dust

A) formed a central bulge
B) became larger in diameter
C) eventually formed into planets
D) became spherical in shape

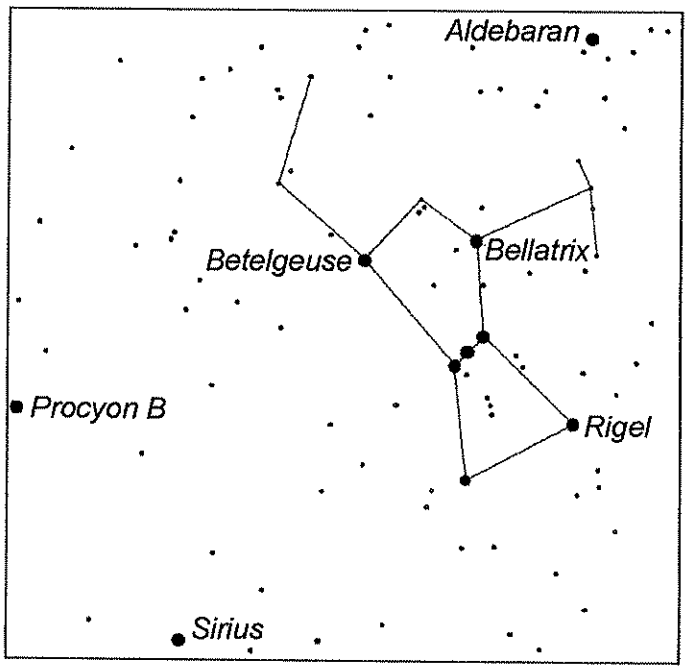
20) The reaction below represents an energy-producing process.

$$\underset{\text{(lighter element)}}{\text{Hydrogen}} + \underset{\text{(lighter element)}}{\text{Hydrogen}} \longrightarrow \underset{\text{(heavier element)}}{\text{Helium}} + \text{Energy}$$

The reaction represents how energy is produced

A) when water condenses in Earth's atmosphere
B) from the movement of crustal plates
C) in the Sun by fusion
D) during nuclear decay

21) The star chart below shows part of the winter sky visible from New York State. Some of the brighter stars are labeled and the constellation Orion is outlined.



In the space below, list the stars, other than *Bellatrix*, in order of decreasing luminosity. *Rigel*, the most luminous star, has already been listed.

Most luminous (1) *Rigel*

(2) _____

(3) _____

(4) _____

Least luminous (5) _____