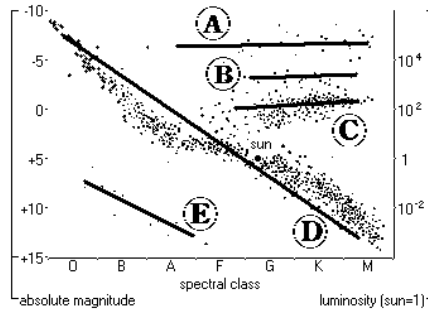


Halfway Home (150,000 points) Multiple-Guess-Fill-In-The-Bubbles

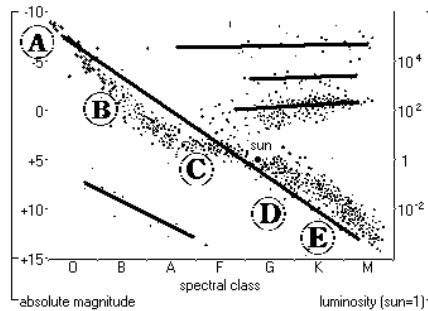
Using the following labels A-E on this Hertzsprung-Russell Diagram :

- 1.) White Dwarfs... **E**
- 2.) Supergiants... **A**
- 3.) Main Sequence... **D**



Using the following labels A-E on this Hertzsprung-Russell Diagram :

- 4.) Red Dwarfs... **E**
- 5.) Highest temperature... **A**



Select the Best Answer from the choices given:

- 6.) The human eye can see down to an angular resolution of about...
 A – $10^\circ = 10$ degrees.
 B – $1^\circ = 1$ degree.
C – $1' = 1$ arcminute.
 D – $1'' = 1$ arcsecond.
 E – None of the above
- 7.) Astronomers tend to classify optical telescopes into two categories:
 A – big and really big.
 B – flat and curved.
 C – amateur and professional.
D – reflecting and refracting.
 E – None of the above
- 8.) The light gathering ability of a telescope is determined by the ____ of the telescope...
 A – cost
 B – length
C – area
 D – diameter
 E – None of the above
- 9.) ... but astronomers usually describe the size of the telescope by measuring the...
 A – cost.
 B – length.
 C – area.
D – diameter.
 E – None of the above

- 10.) A charged atomic system with either extra or missing electrons is an...
 A – atom.
B – ion.
 C – element.
 D – isotope.
 E – None of the above
- 11.) To identify a photon in the E-M spectrum, one needs to know either the wavelength (λ) or its frequency (f), because...
 A – frequency = wavelength .
 B – wavelength = mass \times frequency.
C – frequency \times wavelength = speed of light.
 D – frequency + wavelength = speed of light.
 E – None of the above
- 12.) The Sun's 11-year cycle involves...
 A – The heliopause.
 B – The corona.
 C – Solar eclipses.
D – Sunspots.
 E – None of the above
- 13.) Astronomers can only observe in...
 A – visible light.
 B – visible light and X-rays.
 C – visible light and radio waves.
D – the entire electromagnetic spectrum.
 E – None of the above
- 14.) Interstellar gas clouds can be observed by a distinctive 21cm wavelength microwave signal, which given the makeup of the universe, comes from the spectrum of ...
A – hydrogen.
 B – helium.
 C – mercury.
 D – corbonite.
 E – None of the above
- 15.) Atoms of different elements have unique spectral lines (whether absorption or emission) because each element has...
 A – atoms of a unique color.
 B – a unique number of neutrons.
 C – unique photon energies.
D – a unique set of electron energy levels.
 E – None of the above
- 16.) The Crab Nebula, M1, is observed in X-rays and radio waves. A picture is made combining these two images, which we...
A – can see using the technique of false colors.
- B – cannot see because you can't mix X-rays and radio waves.
 C – cannot see because the images are not in visible light.
 D – cannot see because the images are too dark.
 E – None of the above
- 17.) As the mass of a star increases, its...
 A – luminosity decreases.
 B – color becomes more red.
 C – lifetime increases.
 D – All of the above.
E – None of the above
- 18.) Continuous spectra can be generated by...
 A – black box radiation.
 B – black widow radiation.
 C – black magic radiation.
D – black body radiation.
 E – None of the above
- 19.) Absorption spectral lines come from...
A – photons absorbed by electrons jumping up in levels.
 B – photons emitted by electrons jumping up in levels.
 C – photons absorbed by electrons jumping down in levels.
 D – photons emitted by electrons jumping down in levels.
 E – None of the above
- 20.) Lalande 21185 is an M2 red dwarf about 8 LY away and Betelgeuse is an M2 red supergiant about 600 LY away. Both have a temperature of about 3500 K, but we can see Betelgeuse and not Lalande 21185 with the naked eye because...
A – Betelgeuse is so much more luminous.
 B – Betelgeuse has an apparent magnitude of 26.1 compared to Lalande 21185's apparent magnitude of 10.4.
 C – Betelgeuse has more powerful photons.
 D – All of the above.
 E – None of the above
- 21.) The Sun appears roughly in the center of the Hertzsprung-Russell diagram because...
 A – as humans we believe we are at the center of the universe.
B – our Sun is a pretty average star.
 C – it was the first data point plotted.
 D – the Sun has the highest percentage of hydrogen.
 E – None of the above

22.) The majority of the stars are ...
A – bright supergiants.

B – located in the main sequence.

C – orange dwarfs.

D – stars just like our Sun.

E – None of the above

23.) Star A and B have the same surface temperature, but Star A is half the radius of Star B. Star A is _____ as Star B.

A – twice as luminous.

B – four times as luminous.

C – half (1/2) as luminous.

D – one-fourth (1/4) as luminous.

E – None of the above

24.) The Very Large Array (VLA) is an example of...

A – a space-based telescope.

B – radio interferometry.

C – adaptive optics.

D – a Cassegrain telescope.

E – None of the above

25.) Which of the following is *not* one of the four fundamental forces in nature?

A – Gravity.

B – Weak Nuclear Force.

C – Strong Supernova Force.

D – E-M (Electromagnetism).

E – None of the above

26.) The surface of the Sun is 5777 K, while the temperature of a sunspot is about 4000 K. Sunspots appear dark because...

A – they float on top of the Sun, blocking the light from the surface.

B – they are less bright than the surface.

C – they are massive absorption lines.

D – they are several hundred thousand kilometers deep.

E – None of the above

27.) The core of our Sun has a temperature of about...

A – 5800 Kelvin.

B – 10,000 Kelvin.

C – 1,000,000 Kelvin.

D – 15,000,000 Kelvin.

E – None of the above

28.) The letters O B A F G K M in the main sequence stars represent a progression...

A – of colors.

B – of temperatures.

C – of masses.

D – All of the above.

E – None of the above

29.) Originally stars were classified A B C D E, etc., based on...

A – when the stars were first discovered.

B – their brightness.

C – their size.

D – which hydrogen spectra lines appeared.

E – None of the above

30.) The Sun is currently (2009) in a quiet state with _____ few...

A – granules .

B – craters.

C – sunspots.

D – All of the above.

E – None of the above

31.) Large refracting telescopes can suffer from...

A – extremely long tubes.

B – large heavy lenses on the end.

C – errors in focusing different colors of light.

D – All of the above.

E – None of the above

32.) Stellar nurseries can be found in...

A – clusters of white dwarfs.

B – dust and gas clouds.

C – cometary halos.

D – Van Allen belts.

E – None of the above

33.) Black holes and neutron stars don't show up on our H-R diagram because they are too...

A – dark.

B – low in mass.

C – bright.

D – high in mass.

E – None of the above

34.) Helium in our solar system comes from...

A – leftovers from previous stars.

B – radioactive decay.

C – hydrogen fusion in the core of the Sun.

D – All of the above.

E – None of the above

35.) As stars age, they _____ the Main Sequence diagonal of the H-R diagram.

A – move up along

B – move down along

C – remain forever on

D – eventually move off

E – None of the above

36.) Coming out of a Solar Minimum, you would expect _____ new sunspots to occur at...

A – higher latitudes.

B – lower latitudes.

C – the equator.

D – the poles.

E – None of the above

37.) The Sun has a mass which is _____ times the mass of the Earth.

A – 100 B – 330 C – 1000

D – 330,000 E – 1,000,000

38.) An atomic system with either extra or missing neutrons is an...

A – atom. B – ion. C – element.

D – isotope. E – None of the above

39.) The most abundant element in the universe is...

A – hydrogen. B – helium. C – tritium.

D – oxygen. E – None of the above

40.) As temperature increases, the peak light intensity moves towards the blue and UV due to...

A – Stefan-Boltzman Law.

B – Black Body Radiation.

C – Wein's Law.

D – Kepler's Law.

E – None of the above

41.) As temperature increases, the numbers of all kinds of photons increases, due to...

A – Stefan-Boltzman Law.

B – Black Body Radiation.

C – Wein's Law.

D – Kepler's Law.

E – None of the above

42.) As temperature increases, the average photon energy increases, due to...

A – Stefan-Boltzman Law.

B – Black Body Radiation.

C – Wein's Law.

D – Kepler's Law.

E – None of the above

43.) As temperature increases, new photons of higher energy appear, due to...

A – Stefan-Boltzman Law.

B – Black Body Radiation.

C – Wein's Law.

D – Kepler's Law.

E – None of the above

44.) Helium was discovered in the Sun from...

A – radioactive decay.

B – solar neutrinos.

C – missing spectral lines.

D – extra spectral lines.

E – None of the above

45.) The brightness of an M2 I supergiant star comes from...

A – high temperature.

B – large surface area.

C – low temperature.

D – small surface area.

E – None of the above

46.) Deuterium is a form of...

A – hydrogen. B – helium. C – tritium.

D – oxygen. E – None of the above

47.) Our Sun is located in the center of the H-R diagram because...

A – we make the graph that way.

B – it is a very average star.

C – it is an accident of nature.

D – it is halfway through its lifetime.

E – None of the above

48.) Suppose that the Sun were to suddenly expand in size, but its mass remained the same. What would happen?

A – The Sun's angular size in our sky would stay the same.

B – The Sun's rate of rotation would increase.

C – The Sun's angular size in our sky would decrease.

D – The Sun's rate of rotation would decrease.

E – None of the above

49.) The fictitious planet Zorgh orbits its star in a nearly circular orbit at an average distance of 1.0 astronomical unit. The star's mass is half that of our Sun's mass. The average orbital speed of Zorgh...

A – cannot be determined.

B – is the same as Earth's average orbital speed.

C – is faster than Earth's average orbital speed.

D – is slower than Earth's average orbital speed.

E – None of the above

50.) Suppose the Sun expanded in size, but that its mass remained the same. What would happen to the orbit of the Earth?

A – Earth would move into a smaller orbit.

B – Earth's orbit would be unaffected.

C – Earth's motion would cause it to escape the Sun.

D – Earth would move into a larger orbit.

E – Earth's motion would cause it to fall into the Sun.