Exam #2 Review Sheet

Part #1 Clicker Questions

1) The energy of a photon emitted by thermonuclear processes in the core of the Sun takes thousands or even millions of years to emerge from the surface because
a) it is circling in the gravitational field of the Sun.
b) it loses energy due to convection, conduction, and radiation
c) of the Sun's enormous radius
d) it is absorbed and re-emitted countless times along the way

2) According to the Ideal Gas Law, if the temperature in the core of a star is made 4-times higher, which of the following can happen?
a) The pressure increases by 4 times and the density remains the same
b) The density increases by 4 times and the pressure remains the same
c) Its pressure and density both double.
d) The pressure increases by 4 times while density decreases by 4 times
Its pressure and density both decrease by

3) Sunspots appear dark because they are
a) holes in the photosphere through which you can see deeply into the stellar interior.
b) a bit cooler and thus dimmer than the rest of the photosphere.
c) large opaque structures that block light from the glowing solar surface.
d) causing retinal damage.

4) Which of the following do NOT follow an 11 year cycle?
a) The number of sunspots on the Sun.
b) The typical latitude of sunspots on the Sun.
c) The rate of solar flares.
d) Incidence of strong aurora on the Earth.
e) None of the above.

5) Stars are:
a) solid.
b) liquid.
c) gaseous.
d) mostly carbon, oxygen, nitrogen, and iron.
e) both c and d.

6) Which property of a star would not change if we could observe it from twice as far away?
a) Angular size
b) Color
c) Flux
d) Parallax
e) Proper Motion

7) Two stars have the same surface temperature, but the radius of one is 100 times that of the other. How much more luminous is the larger star?
a) 10 times more luminous.

b) 100 times more luminous.
c) 10,000 times more luminous.
d) 100,000,000 times more luminous.
e) The stars have the same more luminosity.

8) A cool star that is very luminous must have :
a) A small radius
b) A large radius
c) A small mass
d) A great distance
e) A low velocity

9) How do we determine the temperature of a star in order to place it on the H-R diagram?
a) The temperature is related to the mass of a star, which we can measure using Kepler's laws.
b) The temp is related to the size of the star, which we observe with our telescopes.
c) The temperature is related to the peak wavelength emitted by the star which we measure from the stars spectrum.
d) All of the above.

10) How do we measure the stars Luminosity?
a) We can measure the brightness of the star and get the luminosity by measuring the distance.
b) We can measure the radius of a star and the temperature and get the luminosity by combining these two
c) We can measure the Luminosity directly as it is just the number of photons per second captured by the detector.
d) Both a) and b).

11) Most of the brightest stars in the sky are
a) relatively hot main-sequence stars that are relatively close to the Sun.
b) relatively cool giant stars that are relatively close to the Sun.
c) relatively cool main-sequence stars that are relatively far from the Sun.
d) relatively cool main-sequence stars that are relatively close to the Sun.
e) giant stars and relatively hot main sequence stars.

12) If we know that a group of stars are at the same distance, we can plot the following two parameters in place of Luminosity and Temperature on the H-R diagram.
a) Period and luminosity
b) Surface gravity and color
c) Brightness and color
d) Diameter and brightness
e) None of the above

13) If two stars are on the main sequence, and one is more luminous than the other, we can be sure that the
a) more luminous star will have the longer lifetime
b) fainter star is the more massive
c) more luminous star is the more massive
d) more luminous star will have the redder color

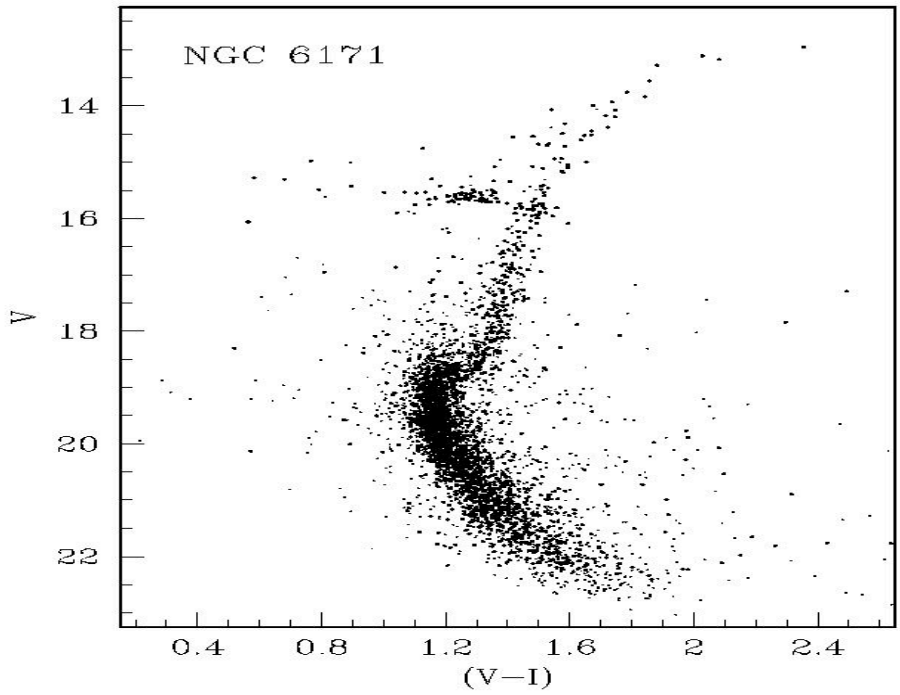
14) How do we know that stars spend most of their lives on the main-sequence?

a) We observe them to “move” very slowly when they are on the MS.
b) We see more stars on the MS than anywhere else.
c) MS stars have a very small proper motion, so we expect very little motion.
d) MS stars are dimmer than other stars and hence must be using fuel more slowly.

15) What determines when a star becomes a main-sequence star?
a) When nuclear fusion generates the energy required to balance gravity
b) When convection begins in the core.
c) When optical radiation leaves the star
d) When the temperature in the core reaches a higher temperature than the corona.

16) If the temperature in the core of the Sun increased, which of the following would occur?
a) The rate of nuclear reactions in the core would increase.
b) The radiation pressure in the core would increase.
c) The core of the star would expand.
d) The temperature in the core would decrease.
e) All of the above.

17) The solar corona has temperatures roughly the same level as temperatures in the Sun's core, where nuclear fusion takes place. Why doesn't fusion occur in the corona?
a) The density in the corona is too low.
b) The corona has too many free electrons.
c) Atoms in the corona are mostly ionized.
d) The corona has more heavy atoms than the core.
e) Two of the above.



For the next two questions, just the diagram above; V is the brightness in the visible and I is the brightness in the near infrared.

18) What are we looking at?

a) Stars of the same mass?
b) Stars of the same color?
c) Stars of the same magnitude?
d)Stars of the same age?

19) What does the mass of the Main Sequence-Turn-off tell us?
a) The Mass of the cluster?
b)The Age of the cluster?
c)The Distance of the cluster?
d) The Brightness of the cluster?

20) Why do stars pass quickly along the HR diagram as they reach the Planetary Nebula Phase?
a) High velocity gas cools quickly, changing the color of the star quickly
b) As the outer layers of the star expand, they become more diffuse, exposing more hot inner layers.
c) As the atmosphere expands, the core shrinks and heats up, becoming bluer.
d) Planetary nebula are fast moving particles that heat the "Inter stellar medium".

21) The primary source of energy for a White Dwarf is
a) Nuclear fusion
b) Nuclear fission
c) gravitational contraction
d) stored heat, cooling passively
e) chemical heat

22) A massive star forms metals heavier than iron
a) At the end of it's main sequence lifetime
b) During the red super giant phase
c) During a supernova
d) never

23) What would Supernovae look like if there were no elements heavier than Iron?
a) There would be no supernovae as there would be no endothermic reactions.
b) About the same as supernovae occur due to core collapse, only elements as heavy as iron in the core.
c) They would be more common as they would occur for elements lighter than iron.
d) None of the above.

Part #2 New sample questions for the Exam

24) . A star is the same radius of the sun but is twice as hot. It must therefore be _____ as luminous.
A. twice B. four times C. half D. eight times E. 16 times

25) The basic evolutionary sequence of a star like the Sun is
A. red giant, protostar, white dwarf, planetary nebula, main sequence
B. protostar, planetary nebula, red giant, main sequence, white dwarf
C. main sequence, red giant, planetary nebula, white dwarf, protostar
D. protostar, main sequence, red giant, planetary nebula, white dwarf
E. protostar, red giant, blue supergiant, supernova

26) A white dwarf is generating its energy from what source?
A. gravitational contraction
B. it no longer generates energy, but is just cooling down from earlier heating

C. nuclear fusion of hydrogen
D. nuclear fission of heavy elements

27) A supernova explosion occurs when
A. the core of a massive star begins to burn iron into uranium
B. the core of a massive star collapses in an attempt to ignite iron
C. a neutron star becomes a cepheid
D. tidal forces from one star in a binary tear the other apart

28) . Red giants get their name because they are
A. very massive and composed of iron oxides which are red
B. very massive and of spectral class O
C. covered with huge prominences that glow with red light
D. very large in diameter and very hot
E. very large in diameter and very cool

29) The relationship between mass and luminosity of stars on the Main Sequence is that
A. the greater the stellar mass, the larger the luminosity
B. the luminosity of stars rises to a peak at around a mass of 1 solar mass, and decreases as mass increases beyond this limit
C. the luminosity is independent of the stellar mass
D. the greater the stellar mass, the less the luminosity

30) . The sun
A. has a predicted main sequence lifetime of about 10 billion years and thus will remain about as it is for another 10 billion years
B. has a predicted main sequence lifetime of about 5 billion years and thus will remain about as it is for another 5 billion years
C. has a predicted main sequence lifetime of about 10 billion years, roughly half of which is over
D. will become a main sequence star in about 4.6 billion years

31) . If we know the true luminosity (ergs/sec) of a star and measure the flux (ergs/cm^2/sec) from it we can determine its
A. mass
B. distance
C. temperature
D. chemical composition

32) . Compared to main sequence stars of the same surface temperature, supergiants
A. are more luminous
B. are less dense
C. have larger radii
D. all of the above
E. none of the above

33) Two stars that have the same surface temperature have the same
A. mass B. luminosity C. radius D. spectral type

34) What fundamental property of a star determines its location on the main sequence?
A. composition
B. mass
C. apparent brightness
D. none of the above

35) . Elements heavier than iron were produced in
A. the centers of stars like the sun
B. supernova explosions
C. gas falling into a black hole
D. planetary nebula