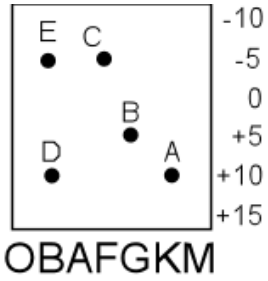
1 Collapsing dust clouds stop breaking apart into smaller clouds when
   a. they acquire magnetic fields.
   b. their dust grains start to stick together.
   c. they become small enough.
   d. their central pressure starts to rise.
   e. their gravity becomes strong enough.

2 Relative to the Milky Way family of stars, our sun is
   a. at the center.
   b. at the extreme edge.
   c. neither at the center nor at the edge.

3 The 'helium flash' refers to
   a. the end of helium burning in a star's core.
   b. the onset of the red subgiant stage.
   c. the onset of the red giant stage.
   d. the explosive ignition of a star's helium core.
   e. the end of hydrogen burning in a star's core.

4 The stars of the Milky Way are all near a great circle on the Celestial Sphere. This great circle
   a. passes through the Celestial Poles.
   b. is the Celestial Equator.
   c. is none of the other things listed here.
   d. is the Ecliptic.

5 In the Hertzsprung-Russell Diagram shown, which point represents a star of type F with absolute magnitude -5?



6 The HR diagram of a young, open cluster typically shows
   a. only the middle part of the main sequence still present.
   b. only the lower part of the main sequence still present.
   c. the entire main sequence still present.
   d. only the upper part of the main sequence still present.

7 Which of the following spectral classes corresponds to the lowest surface temperature (on this list)?
   a. B
   b. G
   c. K
   d. A
   e. F

8 When the iron nuclei in the core of an evolved high-mass star start to come apart, they
   a. trigger a new round of nuclear fusion.
   b. absorb energy and limit the core temperature.
   c. cause the core to expand.
   d. release energy and raise the core temperature.

9 A main-sequence star with more mass than our sun will be
   a. hotter and dimmer.
   b. cooler and brighter.
   c. hotter and brighter.
   d. cooler and dimmer.

10 The Earth's motion around the Sun causes
   a. nearby stars to shift back and forth once a year.
   b. all stars to jump randomly around.
   c. nearby stars to shift steadily in the same direction.
   d. all stars to move away from a point in the constellation Hercules.

11 When the core of a star collapses while inside the star, the result is a
   a. type I supernova.
   b. ordinary nova.
   c. gamma-ray burst.
   d. type II supernova.

12 When the helium fuel runs out at the center of a horizontal branch star, it
   a. swells up and becomes a red supergiant.
   b. explodes as a supernova.
   c. returns to the main sequence.
   d. stops burning and becomes a brown dwarf.
   e. begins to collapse to a white dwarf star.

13 The star 36-Ophiuchus is six parsecs from our Sun. The light from this star in the "serpent holder" constellation has been traveling for approximately
   a. 12 years.
   b. 1.8 years.
   c. 0.55 years.
   d. 6 years.
   e. 20 years.

14 When a white dwarf star collects matter from a neighboring star, fusion reactions on the surface of the white dwarf cause
   a. a helium flash.
   b. a supernova.
   c. novas.
   d. a planetary nebula.
   e. re-expansion to a red giant.

15 On a HR diagram, a visible white dwarf star is in the
   a. upper right corner.
   b. main sequence.
   c. upper left corner.
   d. lower right corner.
   e. lower left corner.

16 The apparent brightness of our Sun is roughly 1000 watts per square meter. At a distance of 30 times the Earth-Sun distance, the apparent brightness of our Sun would be
   a. 1.1 watts per square meter.
   b. 30000 watts per square meter.
   c. 900,000 watts per square meter.
   d. 33 watts per square meter.
   e. 1000 watts per square meter.

17 From the broadening of its spectral lines, one can determine a star's
   a. luminosity class.
   b. apparent brightness.
   c. radial velocity.
   d. spectral type.

18 Cepheid variable stars with the same luminosity usually
   a. are at the same distance from us.
   b. belong to the same star cluster.
   c. have the same apparent magnitude.
   d. have similar periods.

19 The heat formed when an interstellar cloud collapses is carried away by
   a. electromagnetic waves from large molecules.
   b. melting ice on dust particles.
   c. the ejection of hot dust particles.
   d. sound waves caused by turbulence.
   e. outward flowing gas ejected by magnetic fields.

20 Stars with more than 15 times the mass of our Sun usually evolve from the main sequence to red giants
   a. without pausing while getting brighter at almost constant temperature.
   b. without pausing while getting cooler at almost constant brightness.
   c. in several stages, some with almost constant temperature.
   d. in several stages, but none with almost constant temperature.

21 Which of the following colors indicates the coldest star?
   a. peach.
   b. orange.
   c. blue.
   d. yellow.
   e. red.

22 Suppose that the color and behavior of a star identify it as a type that we know has absolute magnitude –3. If the star's apparent magnitude is found to be 2, how far away is it?

a. 5 parsecs.
b. 50 parsecs.
c. 1000 parsecs.
d. 10 parsecs.
e. 100 parsecs.

23 The X-rays that reveal the possible presence of a black hole are the result of

a. vibrations of the hole's event horizon.
b. matter heating up as it falls toward the hole.
c. starlight accelerated in the hole's gravity.
d. gravitons converted to photons by the hole.

24 The idea that a supernova is preceded by a huge burst of neutrinos is

a. a purely theoretical idea that cannot be tested.
b. a prediction that has now been observed.
c. a prediction that has not yet been observed.
d. no longer believed to be correct.

25 Which of the following objects is usually found amoung the stars that make up the Milky Way?

a. Globular Clusters.
b. Planetary Nebulae.
c. Extragalactic Nebulae.

26 In a Hertzsprung-Russell diagram, Red Giant stars such as Betelgeuse are

a. at the lower left.
b. at the lower right.
c. at the upper right.
d. at the upper left.

27 The star alpha-Centauri C has moved across the sky by 3853 seconds of arc during the last thousand years - slightly more than one full degree of arc. Its proper motion is

a. $3853''$/yr.
b. $38.53''$/yr.
c. $3.853''$/yr.
d. $1.9265''$/yr.
e. $0.26''$/yr.

28 The "Little Green Men Standard Time" hypothesis for the repeating radio signals seen in 1968 was rejected partly because the repetition rate was

a. exactly constant.
b. speeding up.
c. slowing down.

29 Once a star has evolved onto the Main Sequence in the HR Diagram, it

a. drifts slowly toward lower mass and brightness.

b. stays at the same point until it runs out of fuel.

c. moves both up and down the sequence.

d. evolves up the sequence toward higher brightness.

30 Stars that are much more massive than our Sun

a. form faster but burn slower.

b. form faster and burn out faster.

c. form more slowly and burn slower.

d. form more slowly but burn out faster.

31 Our Sun is a G2V star with absolute magnitude 4.8. Suppose that a star of spectral type G2V is observed to have apparent magnitude -0.2. How far away is it?

a. 5 parsecs.

b. 10 parsecs.

c. 100 parsecs.

d. 1 parsec.

e. 1000 parsecs.

32 A star is seen to move by 0.2 seconds of arc between February 1, 1999 and August 1, 1999 and then back to its starting point on February 1, 2000. What is the parallax angle for this star?

a. 0.2 seconds of arc.

b. 0.1 seconds of arc.

c. 0.3 seconds of arc.

d. 0.5 seconds of arc.

e. 0.4 seconds of arc.

33 The intense magnetic field of the Crab pulsar causes its rate of spin to

a. increase.

b. decrease.

c. vary up and down.

34 Which of the following spectral types corresponds to the star with the highest surface temperature?

a. G0

b. K0

c. G5

d. K5

35 The formation of electron-degenerate matter in the carbon core of a solar-mass red super giant

a. returns the star to the horizontal branch.

b. prevents carbon-burning from starting.

c. leads to further core collapse.

d. triggers a flash of carbon-burning.

e. causes the core to explode.

36 A star that forms an iron core most likely has a mass of

a. between 15 and 20 solar masses.
b. more than 20 solar masses.
c. less than one solar mass.
d. between 1 and 4 solar masses.

37 The term ”wormhole” refers to

a. a cloud of gravitational waves that holds itself together.
b. any black hole that forms through stellar collapse.
c. a dense bundle of magnetic field lines in a star’s atmosphere.
d. a pair of black holes matched at their event horizons.

38 A star whose apparent brightness is 10^{-6} times that of a first magnitude star would have magnitude

a. 11.
b. 1.
c. 21.
d. 6.
e. 16.

39 The distance modulus of a star at a distance of 10 parsecs would be

a. 15.
b. 5.
c. -5.
d. 0.
e. 10.

40 Which of the following objects is closest in size to a black hole formed from the collapse of a star?

a. a neutron star.
b. a yellow dwarf star.
c. a white dwarf star.
d. a red giant star.

41 The final core collapse that leads to a supernova is ended when

a. all of the electrons are gone.
b. all of the iron has been broken up.
c. the neutrons are gone.
d. the neutrons touch each other.
e. the electrons in the core touch each other.

42 A neutron star in orbit near a normal star is expected to emit

a. no X-rays at all.
b. a constant X-ray signal with no bursts.
c. both a constant X-ray signal and X-ray bursts.
d. bursts of X-rays but no constant signal.

43 The red subgiant stage of a star is best described by

a. increasing temperature and decreasing brightness.
b. dropping temperature and increasing brightness.
c. increasing temperature and increasing brightness.
d. constant temperature and brightness.
e. dropping temperature and constant brightness.

Answer Key: Exam 3 Preview 2

1 Choice d. (their central pressure starts to rise.)

2 Choice c. (neither at the center nor at the edge.)

3 Choice d. (the explosive ignition of a star's helium core.)

4 Choice c. (is none of the other things listed here.)

5 Choice c. (C)

6 Choice c. (the entire main sequence still present.)

7 Choice c. (K)

8 Choice b. (absorb energy and limit the core temperature.)

9 Choice c. (hotter and brighter.)

10 Choice a. (nearby stars to shift back and forth once a year.)

11 Choice d. (type II supernova.)

12 Choice a. (swells up and becomes a red supergiant.)

13 Choice e. (20 years.)

14 Choice c. (novas.)

15 Choice e. (lower left corner.)

16 Choice a. (1.1 watts per square meter.)

17 Choice a. (luminosity class.)

18 Choice d. (have similar periods.)

19 Choice a. (electromagnetic waves from large molecules.)

20 Choice b. (without pausing while getting cooler at almost constant brightness.)

21 Choice e. (red.)

22 Choice e. (100 parsecs.)

23 Choice b. (matter heating up as it falls toward the hole.)

24 Choice b. (a prediction that has now been observed.)

25 Choice b. (Planetary Nebulae.)

26 Choice c. (at the upper right.)

27 Choice c. ($3.853''$/yr.)

28 Choice c. (slowing down.)

29 Choice b. (stays at the same point until it runs out of fuel.)

30 Choice b. (form faster and burn out faster.)

31 Choice d. (1 parsec.)

32 Choice b. (0.1 seconds of arc.)

33 Choice b. (decrease.)

34 Choice a. (G0)

35 Choice b. (prevents carbon-burning from starting.)

36 Choice a. (between 15 and 20 solar masses.)

37 Choice d. (a pair of black holes matched at their event horizons.)

38 Choice e. (16.)

39 Choice d. (0.)

40 Choice a. (a neutron star.)

41 Choice d. (the neutrons touch each other.)

42 Choice c. (both a constant X-ray signal and X-ray bursts.)

43 Choice e. (dropping temperature and constant brightness.)

Solutions

1 Module 047: Star Formation Question 047.21
2 Module 052: The Milky Way Question 052.41
3 Module 048: The Quiet Deaths of Ordinary Stars Question 048.24
4 Module 052: The Milky Way Question 052.11
5 Module 046: The Hertzsprung-Russell Diagram Question 046.12
6 Module 047: Star Formation Question 047.53
7 Module 045: Star Colors and Classes Question 045.22
8 Module 049: Supernova Explosions Question 049.32
9 Module 046: The Hertzsprung-Russell Diagram Question 046.33
10 Module 043: Stellar Parallax Question 043.12
11 Module 049: Supernova Explosions Question 049.61
12 Module 048: The Quiet Deaths of Ordinary Stars Question 048.32
13 Module 043: Stellar Parallax Question 043.34
14 Module 048: The Quiet Deaths of Ordinary Stars Question 048.62
15 Module 048: The Quiet Deaths of Ordinary Stars Question 048.54
16 Module 044: Stellar Magnitudes 044.11
17 Module 046: The Hertzsprung-Russell Diagram Question 046.42
18 Module 052: The Milky Way Question 052.32
19 Module 047: Star Formation Question 047.11
20 Module 049: Supernova Explosions Question 049.21
21 Module 045: Star Colors and Classes Question 045.12
22 Module 044: Stellar Magnitudes Question 044.42
23 Module 051: Black Holes Question 051.22
24 Module 049: Supernova Explosions Question 049.43
25 Module 052: The Milky Way Question 052.23
26 Module 046: The Hertzsprung-Russell Diagram Question 046.21
27 Module 043: Stellar Parallax Question 043.42
28 Module 050: Neutron Stars Question 050.11
29 Module 047: Star Formation Question 047.33
30 Module 047: Star Formation Question 047.41
31 Module 046: The Hertzsprung-Russell Diagram Question 046.54
32 Module 043: Stellar Parallax Question 043.21
33 Module 050: Neutron Stars Question 050.24
34 Module 045: Star Colors and Classes 045.31
35 Module 048: The Quiet Deaths of Ordinary Stars Question 048.42
36 Module 049: Supernova Explosions Question 049.12

37 Module 051: Black Holes Question 051.31

38 Module 044: Stellar Magnitudes 044.23

39 Module 044: Stellar Magnitudes Question 044.32

40 Module 051: Black Holes Question 051.14

41 Module 049: Supernova Explosions Question 049.51

42 Module 050: Neutron Stars Question 050.31

43 Module 048: The Quiet Deaths of Ordinary Stars Question 048.13