

## Practice Exam 2

1. Sirius B, a white dwarf, is than the Sun.  
 (a) less dense and less luminous  
 (b) denser and less luminous  
 (c) less dense and more luminous  
 (d) denser and more luminous
2. Which one of the following statements applies to supernovae?  
 (a) observable only in our own galaxy  
 (b) many occur in our galaxy each year  
 (c) occur only in binaries  
 (d) are comparable in brightness to billions of ordinary stars
3. A typical (Type II) supernova such as SN 1987A results from  
 (a) the fusion of hydrogen on the surface of a white dwarf in a binary star system  
 (b) the fusion of helium (i.e., helium flash) in the core of a red giant  
 (c) the nuclear fusion of iron into carbon and oxygen  
 (d) the explosion of a single massive star
4. In the interiors of red giants, helium nuclei combine in the triple -process to form  
 (a) hydrogen  
 (b) deuterium  
 (c) carbon  
 (d) iron
5. What is the correct order of stellar evolution for single stars with masses similar to the Sun?  
 (a) hydrogen fusion in the core, red giant, white dwarf, supernova  
 (b) red giant, hydrogen fusion in the core, planetary nebula, white dwarf  
 (c) hydrogen fusion in the core, helium fusion, planetary nebula, white dwarf  
 (d) hydrogen fusion in the core, carbon fusion, planetary nebula, black dwarf
6. The sun will not become a  
 (a) white dwarf  
 (b) planetary nebula  
 (c) red giant  
 (d) nova

7. Which of these types of stars will have the longest main-sequence lifetime?

- (a) O5
- (b) B5
- (c)  $1 \times M_{\text{sun}}$
- (d)  $5 \times M_{\text{sun}}$

8. Consider two stars born together in a binary star system. Both stars, an A star ( $2 \times$  mass of the sun) and an F star ( $1.5 \times$  mass of the sun), are initially on the main sequence.

If we come back in a time equal to the lifetime of the sun, we would then find in the binary system

- (a) 2 Red Giants
- (b) 2 White Dwarfs
- (c) 1 Red Giant and 1 White Dwarf
- (d) 1 White Dwarf and 1 Neutron Star

9. After leaving the main sequence in approximately 5 billion years, the sun will first become a

- (a) red giant
- (b) planetary nebula
- (c) white dwarf
- (d) brown dwarf

10. Most stars are

- (a) on the main sequence
- (b) supergiants
- (c) red giants
- (d) white dwarfs

11. Which star is hotter?

- (a) a G2 white dwarf
- (b) a G2 red giant
- (c) the sun
- (d) none of the above

12. The H-R diagram is

- (a) a plot of apparent magnitude vs. absolute magnitude for stars

- (b) a plot of temperature vs. color for stars
- (c) a plot of luminosity vs. temperature for stars
- (d) a plot of mass vs. distance for stars

13. The protostar stage ends when the energy to support a star begins to come primarily from

- (a) gravity
- (b) synchrotron radiation
- (c) degeneracy pressure
- (d) nuclear fusion

14. A protostar contracts because of

- (a) magnetic fields
- (b) nuclear reactions
- (c) degeneracy
- (d) gravity

15. Which of these types of stars forms the fastest( i.e. takes the least time to go from a gas cloud to the main sequence)?

- (a) stars that end up as white dwarfs
- (b) brown dwarfs
- (c) stars that form Type II supernovae
- (d) stars like the Sun

16. Binary star systems, in which one star blocks the light of the other periodically, are known as

- (a) novae
- (b) close binaries
- (c) eclipsing binaries
- (d) pulsating variable stars

17. A nova explosion begins

- (a) at the surface of a main sequence star
- (b) in the core of a main sequence star
- (c) at the surface of a white dwarf
- (d) in the core of a white dwarf

18. A nova explosion results from

- (a) gravitational contraction of the star
- (b) ionization
- (c) fluorescence
- (d) nuclear reactions

19. Suppose a star that was spinning once per day, suddenly collapsed in size. What would the rotation rate be then?

- (a) once per second
- (b) once per day
- (c) once per week
- (d) once per month

20. Immediately before its death, a low-mass (similar to the Sun's mass) star has a core made of

- (a) carbon and oxygen
- (b) helium
- (c) iron
- (d) silicon

21. A person emits mainly

- (a) radio waves
- (b) infrared radiation
- (c) ultraviolet radiation
- (d) protons

22. The density of the center of the sun is most like

- (a) the earth's atmosphere
- (b) water
- (c) rocks
- (d) none of the above

23. The average density of the sun is

- (a) near that of water ( $1.0 \text{ gm/cm}^3$ )
- (b) near that of earth ( $5.5 \text{ gm/cm}^3$ )
- (c) near that of lead ( $11.4 \text{ gm/cm}^3$ )
- (d) much denser than lead

24. Granulation on the surface of the Sun is directly caused by

- (a) convection
- (b) hydrostatic equilibrium
- (c) sunspots
- (d) nuclear fusion

25. Which of the following terms refer to the same objects, viewed in different ways?

- (a) sunspots & filaments
- (b) filaments & prominences
- (c) prominences & sunspots
- (d) prominences & flares

26. Arrange the following features of the sun in order (lowest to highest) of

temperature

- (a) sunspots, photosphere, center of sun, corona
- (b) photosphere, sunspots, corona, center of sun
- (c) sunspots, photosphere, corona, center of sun
- (d) photosphere, sunspots, center of sun, corona

27. Sunspots appear dark because

- (a) they lack magnetic fields
- (b) they are cooler than the surrounding photosphere
- (c) they are holes in the photosphere
- (d) of optical illusion

28. X-rays from the sun only come from the corona. The reason that they don't come from the photosphere is that

- (a) the photosphere is too dense
- (b) the photosphere is too cool
- (c) the photosphere is too thin
- (d) the photosphere is too high in the atmosphere

29. A  $0.5 M_{\text{sun}}$  star burns on the main sequence using

- (a) triple alpha process
- (b) carbon burning
- (c) p-p cycle
- (d) CNO cycle

30. A  $2.0 M_{\text{sun}}$  star burns on the main sequence using

- (a) triple alpha process
- (b) carbon burning
- (c) p-p cycle
- (d) CNO cycle

31. Binary stars are important because

- (a) They allow us to determine stellar masses
- (b) They allow us to determine stellar diameters
- (c) They are systems for the formation of novae
- (d) They are systems for the formation of Type Ia supernovae
- (e) All of the above

32. White dwarfs

- (a) are supported by quantum mechanical pressure
- (b) are about the size of the earth
- (c) are not producing energy by nuclear fusion
- (d) all of the above

33. A ten solar mass star

- (a) Will die as a core collapse supernova
- (b) Will produce a neutron star
- (c) Will dump C, O, Ne, Mg, Si, S, and Fe into the interstellar medium
- (d) Has a convective core
- (e) all of the above

34. Herbig-Haro objects are

- (a) dusty cocoons surrounding protostars
- (b) dusty clouds of gas that seem to be in the process of forming stars
- (c) stars that fluctuate in brightness, bright in the infrared
- (d) regions where jets from newly formed stars are striking the interstellar medium

35. Quantum mechanical pressure

- (a) is independent of temperature
- (b) occurs when electrons are very dense
- (c) is important in white dwarfs
- (d) can be 'lifted' when the temperature becomes very high
- (e) all of the above