

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 α -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 gm/cm³)
- (b) near that of earth (5.5 gm/cm³)
- (c) near that of lead (11.4 gm/cm³)
- (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