Answers

Part 1 (50 pts total)

1. Whirlpool Galaxy
   X-Ray
   23±6 million light-years
   Canes Venatica

2. Sagittarius A* [only accept answers with the *]
   Radio Waves
   25900±2000 light-years
   Sagittarius

3. Orion Nebula
   Visible Light
   1344±30 light-years
   Orion

4. Tycho's Star
   X-Ray
   8900±1200 light-years
   Cassiopeia

5. Crab Nebula
   Infrared
   6500±500 light-years
   Taurus

6. Small Magellanic Cloud (SMC)
   Visible Light
   197000±15000 light-years
   Tucana
7. Ring nebula
   Infrared
   2700±1500 light-years
   Lyra

8. Andromeda Galaxy
   Ultraviolet
   2.54±.5 million light-years
   Andromeda

Total points = 8x4 = 32

9. Star Chart Constellations (1 point each):
A. Ariga
B. Ursa Major
C. Cassiopeia
D. Lyra
E. Hercules
F. Andromeda
Star Chart Stars (1 point each):
a. Capella
b. Castor
c. Mizar & Alcorx
d. Algol

Total points = 6x1 =10

9. Evolutionary stage for each star
Spica: blue giant Aldebaran: red giant Deneb: blue-white supergiant Proxima: red dwarf

HR diagram sheet needed here

Total points – 8 x1 =8

End of part 1 (Total points for part 1 = 50)

Part II (50 pts)

1. What is the Sun's spectral class? (1 pt) ___G2V_____
2. What is the Sun's absolute magnitude? (1 pt) ____4.8-4.9_____
3. At what distance are apparent and absolute magnitude the same? (1 pt) ____10 parsecs or 32.6 LY_____
4. What do the H and R stand for in "H-R diagram"? (2 pts) _____Hurtzsprung and Russell_____

_____

5. What does the H_R diagram plot? (2 pt)

   __Temperature or class (y axis) to absolute

   magnitude_____

6. Antares emits a large portion of its energy in what non-visible wavelength? (1 pt)

   Infrared_____

7. White dwarfs can go supernova when they approach a certain mass. What is the name of this

   "critical mass"? (2 pts) _____Chandrasekhar

   limit_____

8. What type of supernova results from a white dwarf gaining too much mass and exploding? (1 pt)

   _____Type 1 A_____

9. Vega, Altair, and Regulus are flattened at the poles and bulging at the equator. What causes this?

   (2 pts) ____Rapid rotation (high spin /non speed/__non solid

   composition)_____

10. Which star, excluding the sun, is the closest to Earth? How far is it (to .1 light years)? (2 pts)

    _____Promixima Centauri, 4.2 LY

    _____

11. What is the term for stars that don't have enough mass to start nuclear fusion? (1 pt)

    ____Brown dwarf

    _____

12. What are the evolutionary stages of a Sun-sized star? (4 pts)

____ Protostar [condensing gas]
Main sequence star

Planetary nebula [white dwarf]
White dwarf [black dwarf, only accept if answer for d was white dwarf]

13. For the sake of convenience, astronomers have divided the sky into 88 constellations. In which of these does the current Polar star, Polaris, lie? (1pt)

Ursa minor

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14. What is the general relationship between the mass of a star and its lifespan? (1 pts)
_____The larger the mass , the shorter the life
span_____
_____

15. Sun's spectral class : G2V

16. Hottest star : 0

17. Spectrum with coolest star: M

18. Most energy is emitted as UV : 0

19. Most energny is emitted as infrared : M

20. Brightest stasr in the nighttime sky

21. Stars in clusters are bound together by what? Gravity

22. Keppler's third law: More distant planets orbit the Sun at slower average speeds,

obeying a precise mathematical relationship, $P^2 = a^3$
P is the planet's orbital period in years and "a" is its average distance from the Sun in astronomical units.

23. Stellar luminosity classes

Class I: Supergiants

Class II: Bright giants

Class III: Giants

Class IV: Subgiants
Class V: Main-sequence stars

24. Types binary star systems

Visual binary, eclipsing binary, spectroscopic binary

25. Two important properties of telescope and explain their function.

Light-collecting area: tells us how much total light the telescope can collect at one time.
Angular resolution: is the smallest angle over which we can tell that two dots – or two stars – are distinct.

26. What is luminosity? (1 pt)

_Total amount of energy radiated per second_____
_____

27. What are the 3 main types of galaxies ? (3pts)
_Spiral, Elliptical, Irregular
_____
_____

28. What is pulsar and what is it made up of ? (2 pts)
Supernova remnant and composed entirely of neutrons

29. What is the difference between absolute and apparent magnitude (2 pts)

_Apparent magnitude = the brightness of object as seen from the viewer's viewpoint (Earth)
Absolute magnitude = "true brightness" – brightness as seen from 10 parsecs (32.6 light years) away
_____

30. Explain the following terms: (2 pts)
    a. Astronomical unit
    b. Light year?

__1 astronomical unit = distance between Earth and Sun = 150 million kilometres or 93 million miles
1 light year ≈ 6 trillion miles / 9.5 trillion km
Distance that light travels in 1 year_____
_____