00043

Reg. No:

The Open University of Sri Lanka
B.Sc. Degree Programme- Level 05
NBT 2- 2016/2017
PYU3172/PYE5172- Astronomy
Duration: One (01) Hour

Date: 11.11.2017 **Time: 9.00 a.m. – 10.00 a.m.**

(Useful information : Speed of light $c = 3 \times 10^5$ km/s,
Universal gravitational constant $G = 6.67 \times 10^{-11}$ m^3 kg^{-1} s^{-2}
Wien's constant W = 2940 μm K).

Underline the Correct Answer in the Question Paper

1. Which one of the following reactions is not a part of the mechanism of the H fusion reaction that takes place inside the Sun

   a) $^1H + {}^1H \rightarrow {}^2D + e^+ + \nu + 1.44$ MeV

   b) $^2D + {}^1H \rightarrow {}^3He + \gamma + 5.49$ MeV

   c) $^3He + {}^3He \rightarrow {}^4He + {}^1H + {}^1H + 12.85$ MeV

   d) $2\ {}^1H + {}^2D \rightarrow {}^4He + 2\ e^+ + 2\ \nu + 2\ \gamma + 26.7$ MeV

2. Approximate time taken by a photon generated at the nuclear core of the Sun to reach the interface layer would be

   a) 8.5 minutes. b) a million year.
   c) 4.2 light years. d) none of the above answers are correct.

3. Which of the following expression on solar Faculae is incorrect

   a) Faculae are areas of magnetic fields concentrated into smaller bundles than sunspots.
   b) They appear bright in contrast to sunspots and usually seen more often near the limb, or edge, of the solar disk.
   c) During a sunspot cycle the faculae actually win out over the sunspots and make the Sun appear slightly (about 0.1%) brighter at sunspot maximum than at sunspot minimum.
   d) None of the above expressions are correct.

4. "All the parameters of a star (its spectral type, luminosity, size, radius and temperature) are determined primarily by one unifying physical parameter and that is mass of the star", is known as

   a) Planck's Law b) Russell-Vogt Theorem
   c) Pogsons Theroem d) Wien's Law.

5. A red color star has a spectrum with wavelength 0.98 μm at its maximum intensity. What would be the surface temperature of this star?
   a) 2000 K b) 2500 K c) 3000 K d) 3500 K

6. The first known classification of stars in the night sky in to several groups based on their brightness was made by Hipparchus during the 2nd century B.C. How many star groups were there in his classification?
   a) 6 b) 12 c) 100 d) 1000

7. According to modern classification of stars, the brightness of two stars whose apparent magnitudes (m) differ by unity will differ by a factor of 2.512.
   a) 1 b)2.512 c) 100 d) 3.261

8. Human naked eye cannot see the stars beyond the apparent magnitude(m)
   a) 6 b) 12 c) 100 d) 1000

9. The apparent magnitude of the Sun is
   a) 1.0 b) 6.0 c) -26.8 d) -1.4

10. The absolute magnitude (M) of a star is its apparent magnitude when it is kept at a standard distance of (in Light Years)
    a) 1.0 LY b) 10 LY c) 3.26 LY d) 32.6 LY

11. The Absolute magnitude (M) of the nearest star Proxima Centauri at a distance of 1.3 pc having an apparent magnitude of m= 11.01 is (you may use the distance modulus formula)
    a) 15.45 b) 4.21 c) 13.24 d) 1.45

12. If the distance to a star is 2 pc what is the heliocentric parallax that star in arc seconds? s
    a) 3 b) 0.012 c) 0.05 d) 0.5

13. The energy radiates by a star per second integrated over all wavelengths is called
    a) bolometric luminosity b) bolometric magnitude
    c) absolute bolometric magnitudes d) none of the above.

14. Spectrum binaries are identified by
    a) Variation of light intensity.
    b) Doppler shift of spectral lines.
    c) Spectral fingerprints of two different stellar types.
    d) Seen as two star through a telescope.

15. To measure the distance to far away galaxies we use the period-luminosity relationship of
    a) Cepheid variable stars b) Mass of a star
    c) Parallax method d) Eclipsing binaries

16. Which of the following two stars are not orbiting around a common barycenter
    a) Optical double b) Eclipsing binary c) Spectroscopic Binary d) Spectrum binary

17. The equipotential lines around a Contact binary system where the forces or energies balance is called
    a) Light curve b) Roche lobe c) Escape velocity d) Event horizon

18. The famous star classification Harvard sequence is a colour and temperature sequence as well as a spectral sequence. The correct sequence is
    a) A-B-C-D-E-F-G-H (-S)
    b) O-B-A-F-G-K-M (-S)
    c) A-B-A-F-G-K-M-O (-S)
    d) O-B-A-F-G-M-K (-S)

19. According to the Harvard sequence, our Sun is a
    a) G - type star b) O - type star c) A - type star d) T-Taury star

20. If the radius of the Sun is 6.96×10^8 m and its surface temperature is 5780 K. The Luminosity of our Sun is
    a) 3.84×10^{26} W b) 2.34×10^{26} W c) 1.0×10^{15} W d) 9.25×10^{16} W

21. If a collapsing interstellar gaseous dust cloud has a mass less than a certain value, the end result would be a "brown dwarf" as its internal temperature never reaches a value high enough for thermonuclear fusion to begin. This critical mass in the units of solar masses is
    a) 0.08 b) 1.4 c) 7.96 d) 10

22. The colour of a brown dwarf is
    a) brown b) red c) coffee brown d) black

23. Most of the stars in the H-R diagram fall on the region of
    a) red giants b) main sequence
    c) white dwarfs d) super giants

24. What can you find in the bottom left corner of the H-R diagram?
    a) brown dwarfs b) red giants
    b) c) white dwarfs d) super giants

25. In which phase of a star's life are thermonuclear reactions converting hydrogen into helium in the core of a star?
    a) the main sequence phase
    b) the horizontal branch phase
    c) as the star moves up the red giant branch for the first time
    d) death: either as a supernova or planetary nebula

26. The maximum distance to a star that can be measured accurately using trigonometric parallax method is
    a) 3.26 parsecs.
    b) 50 parsecs.
    c) 150 parsecs.
    d) 2600 parsecs.

27. The early phase in the life of a star is called
    a) main sequence b) T-Tauri phase
    c) brown dwarf d) B-Lyrae phase

28. Which of these layers of the sun is coolest?
    a)convective zone b)photosphere c)chomosphere d)corona

29. Spica whose parallax is 0.013 ". What would Spica's parallax be if it were measured from an observatory on Saturn's moon Titan as Saturn orbits the Sun?(distance from Saturn to Sun is 10 A.U)
    a) 0.013" b) 0.0013" c) 0.13" d) 0.13^{O}

30 A, B, and C are three stars with temperatures of 6000K, 24000K, and 3500K, respectively. What is the possible colour sequence of those stars A, B and C, respectively.
    a). Yellowish, Bluish, Reddish b) Reddish, Bluish, Yellowish
    c) Bluish, Yellowish, Reddish d) Yellowish, Reddish, Bluish

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