Section A: Multiple Choice [32 points]

1. Which of the following constellations are visible during the summer?
    A. Delphinus
    B. Taurus
    C. Monoceros
    D. Eridanus

2. Which stars make up the Winter Triangle asterism?
    A. Regulus, Spica, Arcturus
    B. Sirius, Procyon, Betelgeuse
    C. Vega, Altair, Deneb
    D. Alpheratz, Algenib, Markab

3. The moon is at its upper culmination at 8pm, mean solar time. Estimate the phase of the moon.
    A. Waning Gibbous
    B. Waning Crescent
    C. Waxing Gibbous
    D. Waxing Crescent

4. Arrange the following stages of the life cycle of a star of one solar mass in chronological order - Red-giant branch, Planetary nebula, White dwarf, Main sequence star, Helium Flash.
    A. Main sequence star, Red-giant branch, Helium Flash, Planetary nebula, White dwarf
    B. Main sequence star, Helium Flash, Red-giant branch, Planetary nebula, White dwarf
    C. Main sequence star, Red-giant branch, Helium Flash, White dwarf, Planetary nebula
    D. Main sequence star, Helium Flash, Red-giant branch, White dwarf, Planetary nebula

5. How are the rings of Saturn thought to be formed?
    A. They coalesced during the formation of the Solar System
    B. They were ejected from the surface of Saturn by a massive meteor impact.
    C. They are the disintegrated remains of some of Saturn's moons and captured meteorites
    D. They were gravitationally captured from the interstellar medium

6. The James Webb Space Telescope is to be sent to the second Lagrange point of the Earth-Sun system. What is the significance of doing so?
    A. The telescope would require little expenditure of energy to maintain its orbit
    B. The Earth would shield the telescope from the intense solar radiation
    C. The Moon would shield the telescope from the intense solar radiation
    D. It allows for ground control to communicate easily with the telescope

7. Which of the following is not a possible method of detecting exoplanets?
    A. To observe the wobbling of the parent star due to the gravitational influence of the planet
    B. To observe the doppler shift of light emitted by the parent star due to the gravitational influence of the planet
    C. To observe the periodic dips in the brightness of the parent star due to planetary transits
    D. All of the above are possible methods for detecting exoplanets

8. An 8 inch Dobsonian telescope with a focal ratio of f/6 is used with a 12mm Plossel eyepiece. Calculate the magnifying power of the telescope. *(1 inch = 25.4mm)*
    A. 30x
    B. 50x
    C. 100x
    D. 200x

9. Approximately how much higher is the limiting magnitude of a telescope than that of the human eye? Assume that the telescope has an aperture of 200mm and the diameter of the human iris is 5mm. *(A magnitude difference of 5 corresponds to a 100-fold difference in luminosity).*
    A. 6.0
    B. 7.0
    C. 8.0
    D. 9.0

10. What is the advantage of an Equatorial telescope mount as compared to an Alt-az mount?
    A. Reduced vibrations and provides a more stable viewing platform
    B. Convenience of tracking the diurnal motion of the stars
    C. It can be made more compact than an Alt-az mount
    D. It is less complex than the Alt-az mount

11. Alberio (β Cygni) is a double star system in the constellation Cygnus. The magnitudes of the component stars Alberio A & Alberio B are given by 3.18 and 5.82 respectively. Find the apparent magnitude of Alberio.
    A. 2.96
    B. 3.09
    C. 3.49
    D. 4.75

12. Which of the following stars is circumpolar in Romania (44°25'N 26°06'E)? *(Circum-polar stars are stars that never set).*
    A. ζ Herculis (16h41m/+31°36')
    B. β Böotis (15h01m/+40°23')
    C. θ Aurigae (5h59m/+37°12')
    D. γ Draconis (17h56m/+51°26')

13. Haley's comet last appeared in the night sky in 1986. The Perihelion and Aphelion of its orbit are given by 0.586AU & 35.1AU respectively. Predict when it will next return.
    A. 2036
    B. 2052
    C. 2061
    D. 2096

14. What would be the maximum speed of a meteor on a parabolic orbit around the sun, whose point of closest approach is 1AU?
    A. 42.1 km/s
    B. 58.4 km/s
    C. 77.1 km/s
    D. 92.8 km/s

15. Estimate the lifespan of the Sun. (Mass of H : 1.00794u; Mass of He : 4.002602u)

    A. 8.5 Billion Years
    B. 9.6 Billion Years
    C. 10.2 Billion Years
    D. 10.7 Billion Years

16. Calculate the length of the shortest day that can be experienced in Romania (44°25'N 26°06'E). *(Earth's axial tilt is 23.4)*

    A. 8h 12m
    B. 8h 39m
    C. 9h 04m
    D. 9h 25m