

*The Open University of Sri Lanka*  
*B.Sc. Degree Programme- Level 05*  
*NBT 1- 2016/2017*  
*PYU3172/PYE5172- Astronomy*  
 Duration: One (01) Hour



Date: 08.10.2017

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<sup>3</sup> kg<sup>-1</sup> s<sup>-2</sup>).

**Underline the Correct Answer in the Question Paper**

- Using the angle between the Moon and the Sun at 1<sup>st</sup> Quarter, Tycho Brahe first showed that
  - Sun was much farther than the Moon and from the Earth.
  - Solar eclipses never occur on full moon days.
  - Moon is a satellite of Earth.
  - Tides on Earth are caused by gravitational pull of Moon.
- Which of the following planet does not show a retrograde motion?
  - Venus
  - Mars
  - Jupiter
  - Saturn
- Which of the following is not a discovery made by Galileo?
  - sunspots on the Sun and craters and mountains on the Moon.
  - rings of Saturn.
  - the phases of Venus.
  - the telescope.
- The Galilean satellite with active volcanos is
  - Io
  - Europa
  - Callisto
  - Ganymede.
- According to the Kepler's third law, the period of a Sun-orbiting asteroid with semi major axis 4 AU in years is
  - 1.0
  - 4
  - 8
  - 64
- Trojan asteroids can be found in
  - Jupiter's orbit
  - Near Earth Orbit
  - Greece
  - Asteroid belt
- The shape of our own Milky Way Galaxy is
  - elliptical
  - spiral
  - barred-spiral
  - irregular
- Which of the following expression describes the escape velocity of a planet. (Here symbols are in their standard notation.)

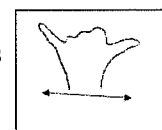
(a)  $\sqrt{\frac{2GM}{R}}$

(b)  $\sqrt{\frac{GM}{R}}$

(c)  $4\pi\sqrt{\frac{2GM}{R}}$

(d)  $\sqrt{\frac{GMm}{R}}$

9. Imagine a planet having mass and radius double those of the earth. The escape velocity of the planet at its surface would be  
 a) 7.9    b) 11.2    c) 54.0    d) non of the answers are correct
10. The plasma tail of a comet  
 a) is similar to the dust tail.  
 b) always points towards the sun.  
 c) has a yellowish colour and curved appearance.  
 d) has a bluish colour and points away from the Sun.
11. The brightest star in constellation Canis Major or Alpha Canis Major is commonly known as  
 a) Sirius  
 b) Capella  
 c) Rigel  
 d) Betelgeuse
12. The angular separation indicated in the sky using the following fingers as shown in the figure is  
 a) 5 degrees    b) 10 degrees    c) 20 degrees    d) 25 degrees



13. The point where the Sun is highest in the northern hemisphere is called  
 a) winter solstice    b) summer solstice    c) equinox    d) meridian

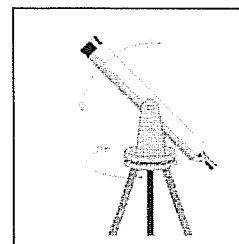
14. The projection of the Sun's path across the sky during the year is called the  
 a) declination    b) ecliptic    c) celestial equator    d) haleopause

15. The photometer used in astronomy can be used to  
 a) find the elements presence in a distant nebula.  
 b) find the brightness of a distant star.  
 c) find the expansion of the universe.  
 d) receding velocity of a galaxy.

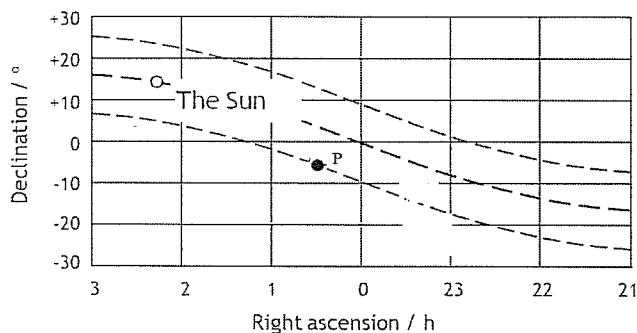
16. S-type asteroids in the Asteroid Belt are rich in  
 (a) Metal    (b) Carbon    (c) silicate materials    (d) Nickel

17. Find the incorrect expression  
 a) Right Ascension and Declination serve as an absolute coordinate system fixed on the sky.  
 b) Right Ascension is the equivalent of longitude, only measured in hours, minutes and seconds.  
 c) Declination is the equivalent of latitude measured in degrees from the celestial equator (0 to 90).  
 d) Right Ascension and Declination of a celestial object (planet or star) varies with the location of the observer.

18. The mounting system of the telescope shown in the figure is  
 a) equatorial mount.  
 b) alt-az mount.  
 c) floor mount.  
 d) non of the above answers are correct.



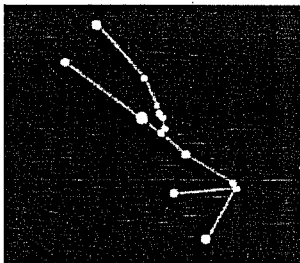
19. The light gathering power of a refracting telescope with the diameter of the objective lens  $D$  is given by  
 a)  $D$                       b)  $D^2$                       c)  $D^3$                       d)  $1/D$
20. The incorrect expression about the definition on "dwarf planet" is that it is a celestial body  
 a) is in orbit around the Sun.  
 b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape.  
 c) has cleared the neighborhood around its orbit.  
 d) is not a satellite.
21. The diagram below shows part of the celestial sphere. The Sun and a planet P are labelled. The central dashed line is the ecliptic. Use the diagram to answer the questions from 21 to 23.



What are the celestial co-ordinates of the planet P?

- | <i>RA</i>     | <i>declination / °</i> |
|---------------|------------------------|
| a) 0 h 30 min | -05                    |
| b) 0 h 50 min | -15                    |
| c) 1 h 30 min | -05                    |
| d) 1 h 50 min | -15                    |
22. What is the name of the region in between the two dashed lines either side of the ecliptic?  
 a) Goldilocks Zone  
 b) Van Allen Belt  
 c) Zodiacal Band  
 d) Zoological Band
23. In which season of the year would the Sun lie on the celestial sphere at the position shown?  
 a) Spring                      b) Summer                      c) Autumn                      d) Winter
24. An astronaut in planet Earth goes to Saturn. If the distance to Saturn from the Sun is about 10 A.U., the reduction of brightness of Sun as seen from Saturn would be.  
 a) 0.01    b) 0.04    c) 0.5    d) no reduction

25. The Zenith Hourly Rate (ZHR) is hourly rate of
- the number of naked-eye meteors seen under perfect conditions (no clouds or moonlight) with the radiant overhead.
  - the number of asteroids seen under perfect conditions (no clouds or moonlight).
  - the number of comets seen under perfect conditions (no clouds or moonlight).
  - none of the above answers is correct.
26. Apollo Family asteroids are
- those with near-solar orbits and some having highly eccentric orbits that are Earth-crossing.
  - those located at either the leading or trailing Lagrangian points in Jupiter's orbit.
  - asteroids those are 1:1 resonance with Jupiter.
  - asteroids having Mars-crossing orbits.
27. Why does the plasma tail of a comet point away from the Sun?
- it follows the orbit of the comet.
  - the solar wind pushes the ionized gas.
  - angular momentum.
  - its too hot near Sun.
28. For an observer in Jaffna, the approximate elevation of the Polaris above the horizon, in degrees, is
- 10
  - 83
  - 25
  - nothing in particular; its elevation changes as the seasons pass.
29. What is the most likely origin of a comet having its path perpendicular to the ecliptic?
- Asteroid Belt
  - Kuiper Belt
  - Oort Cloud
  - Zodiacal Band
30. The famous Crab nebula is in this star constellation shown in the following figure. The name of the constellation is



- Sagittarius
- Lyra
- Virgo
- Taurus

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