OLABISI ONABANJO UNIVERSITY, AGO-IWOYE.
DEPARTMENT OF PHYSICS
2017/2018 HARMATTAN SEMESTER EXAMINATION
PHY211: INTRODUCTION TO ASTRONOMY AND ASTROPHYSICS

INSRUCTION; Answer all questions in section A and B below   TIME: 1hour 30mins

Section A

1. A new type of astronomical entity discovered on a photographic plate of the sky or the radio astronomical record is referred to as
    (a) Planets   (b) New object   (c) Stars   (d) Cosmic ray

2. When can we see the sun corona?   (a) During the full moon   (b) eclipse of the Sun   (c) During solar eclipse
    (d) During total solar eclipse

3. The three major varieties of objects that populate the universe are (a) Sun, Earth and Moon (b) Sun, Sirius and Arcturus
    (c) Arcturus, Pollux and Sirius   (d) Mars, Earth and Venus

4. Which of the following planets show heavy impact on craters?   (a) Venus and Pluto   (b) Mars and Mercury   (c) Earth
    and Mercury   (d) Mars and Venus

5. The time interval between successive similar configuration of the object, that is, the Sun and the Earth is referred to as   (a)
    Sidereal period   (b) Transformation period (c) Synodic period   (d) 1 revolution

6. The eccentricities of all planets are less than 0.09 except for the two large one belonging to   (a) Mars and Pluto   (b) Pluto
    and Earth   (c) Marc and Neptune   (d) Mercury and Pluto

7. The emission of cloud of electrons and protons from the Sun that strengthen the solar wind gives rise to   (a)   Ionization
    energy and power surge   (b) Magnetic storm and aurorae   (c) Magnetic storm and rainfall intensity   (d)   Counter
    electrojet and magnetic induction

8. The following are example of inner planets   (a) Mercury, Pluto, Mars and Earth (b)Mercury,   Sun,   Moon   and
    asteroid (c) Mercury, Venus, Earth and Mars(d) Mercury, Venus, Moon and Neptune

9. The types of eclipse are (a) Solar and total solar eclipse   (b) Eclipse of the Moon and solar eclipse   (c) Partial and total eclipse
          (d) Annular and total eclipse

10. The predominant chemical elements in the Sun that constitutes about 99.9% of all the atoms are   (a) CO and H   (b)   H
    and He   (c) H and N   (d) OH and NH₄

Section B

1. (a)   State four (4) regularities in the planetary systems
   b(i)   Differentiate between aphelion and perihelion. They are also known as.
   (ii)   Use Titus Bode's law to calculate the mean distance of all the planets from the Sun.
   (iii)   Why does the law fail for Pluto?

2. (a)   State Kepler's laws
   (b)   Newton's law of universal gravitation tells us that gravitational attraction on a planet by the Sun is GMm/R^2, where G is a
           gravitational constant, M, the mass of the sun and m is the mass of the planet. The centripetal force on a body moving in a
           circle is mv^2/R and its speed is $2\pi R/T$.
   (i)   Explain why the speed is $2\pi R/T$.
   (ii)   Show that the centripetal force on a planet is $m4\pi^2R/T^2$.
   (iii)   Explain why we write $\frac{GMm}{R^2} = m4\pi^2R/T^2$.
   (iv)   Express R^3/T^2 in terms of G and M.

3. (a)   Explain with the aid of diagrams the progression difference of the Sun and Moon during total solar eclipse and annular solar
          eclipse.
   (bi) √ Differentiate between Sidereal period and Synodic period.
   (bii) The synodic period of Venus was found to be 583.9 days. If the length of the year is 365.25 days, calculate the sidereal period
          of Venus.
   (c)   Differentiate between inner and outer planets.