PHYSICS THEORY 2009

Time: 3 Hours Max.Marks.75

Note: Attempt **six** questions in all, selecting **three** questions from **Section A**, **two** questions from **Section B** and **one** question from **Section A**.

SECTION "A"

1. (a) Derive the equation $S = V_i t + \frac{1}{2} at^2$ (05)

   (b) Write two points of different between the following (04)
   (i) Mass the Weight (ii) Heat and Temperature

   c) A motorcycle is moving with a velocity of 72km/hr on a straight road. When the brakes are applied the motorcycle comes to rest after covering a distance of 10 meters. Calculate its acceleration. (03)

   (d) The name of the famous book of Al-beruni is _____.
   Fill in the blank. (01)

2. (a) Define Kinetic Energy and derive the relation $K.E = \frac{1}{2} mv^2$

   (b) State the following Laws/Principles: (05 + 04)
   (i) Law of Coversation of Momentum (ii) Law of Inertia
   (iii) Archimedes' Principle (iv) Law of Heat Exchange

   c) Find the work done when a force of 400N acting at an angle of 60° with the ground moves an object to a distance of 10 meters along the ground. ($\cos 60^\circ = 0.5$) (03)

   (d) Why does a nail sink in water whereas a ship having a much bigger mass floats in surface of water? (Give scientific reason.) (01)

3. (a) Define Resolution of a Vector. How is a vector resolved into its component of vectors? (05)

   (b) State Newton's Law of Gravitation and derives the relation

   $$F = G \frac{m_1 \times m_2}{r^2}$$ (04)

   c) Define a Machine and its Mechanical Advantages. Find the Mechanical Advantages of an inclined plane. (03)

   (d) The value of G is _____. (Fill in the blank) (01)

4. (a) Define Centripetal Force. What are the factors on which it depends? Write down the formulae of centripetal force. (05)

   (b) Write two contributions of each of the following (04)
   (i) Al Beruni (ii) Ibn-ul-Hitham

   c) State Boyle's Law, Charles' Law and write the formulae of the General Gas Equation. (03)

   (d) The speed of a body in a given direction is called _____.
   (Fill in the blank) (01)

5. (a) Define: (05)(
   (i) Co-efficient of Linear Expansion (ii) Specific Heat
   (iii) Regulations (iv) Torque (v) Center of Gravity

(b)   Define Stress, strain and state Hooke's Law and write the formulae of young's Modulus of electricity.

(c)   Write three states of Equilibrium with the help of a diagram

(d)   Why is a gap left between two pieces of railway track? (Give scientific reasons)

SECTION "B"

6.   (a) Draw a ray diagram of the image formed by a plane mirror and write its three characteristics.   (04)

(b) Define the following: (04)

(i)   Regular reflection   (ii) Refractive index (iii) Direct Current
(iv) Electromagnet

(c) An object is placed at a distance of 15cm from   a concave mirror of focal length 10cm. Find the position and nature of the image formed by it.(03)

(d) The unit of charge is _____. (Fill in the blank)   (01)

7.   (a) Define Total Internal reflection with the help of ray diagram and write down the two conditions necessary for it.

(b) State and explain coulomb's law, derive the equation   (04)

$$F = K \frac{q_1 \times q_2}{r^2}$$

(c) Find the potential difference between two ends of a conductor if its resistance if 5 ohms and a current of 500 milli ampere is passing through it. (03)

(d) The unit of current is _____. (Fill in the blank)   (01)

8.   (a) Write down the three characteristics of the resistances.   (04)

(b) Write down the four uses of spherical mirrors.   (04)

(c) Describe the Newton's Corpuscular Theory of light.   (03)

(d) Magnification = _____ . (Fill in the blank)   (01)

SECTION "C"

9.   (a) Define Wavelength, Frequency and Velocity of a wave and derive the equation $V = f \lambda$ (04)

(b) Write four properties of Alpha rays   (04)

(c) Define the following:

(i)   Half-Life of an element   (ii) Radar   (iii) Transistor   (03)

(d) The elements having mass number more than 82 are called _____. (Fill in the blank)   (01)

10. (a) Define simple Harmonic Motion and verify it with the help of a simple pendulum.   (04)

(b) Write two points of difference between the following: (04)

(i)   P-Type substance and N-Type substance

(ii) Fission Reaction and Fusion Reaction

(c) State three characteristics of a musical sound and describe any one of

them.   (03)

(d) The sound of thunder in the sky is heard later than the streak of light although they are produced at the same time. (Give Scientific reasons).

(01)