St. Mary's School, Dwarka
Holidays Homework
Class – XI
Subject: Physics
Week 4
Worksheet – 4

Objective:

- Revision of concepts
- Skills to carry out research and develop scientific aptitude
- Encouraging learning through experiences

Instructions:

- Neatly write all the answers in your Physics note book.
- Attempt the questions keeping in mind the weightage of each question.
- Assignment 'Summer Holiday Homework' will be created on TEAMS. PDF of handwritten work should be uploaded on it. **M.M : 25**

Q1. Define Dimensions and list two of its uses. (2)

Q2. (i) List two limitations of Dimensional Analysis. (ii) Mention the SI unit of supplementary physical quantity (a) plane angle (b) solid angle. (2)

Q3. Write SI units of all seven basic physical quantities. (2)

Q4. If C represents capacitance and R represents resistance, then which of the following will be the unit of CR^2 ? Explain your answer. (2)

(a) Henry (b) Volt – Sec./Ampere (c) Volt/ampere (d) Joule/ampere^2

You are given that capacitance C= qV and Resistance R = V/I where q,V and I have their usual meaning

Q5.Write the order of following intervals in seconds:

(i) Time between two heart beats (ii) Time of earth's revolution

(iii)Time of earth's rotation (iv) Human life (2)

Q6. The factors affecting the time period of a simple pendulum are mass, length and the acceleration due to gravity. Use method of dimensions to deduce a relation for the time period of a simple pendulum. (3)

Q7. The wavelength λ associated with a moving particle depends upon its mass *m*, its velocity *v* and Planck's constant *h*. Show dimensionally the relationship between them. (3)

Q8. Deduce by the method of dimensions, an expression for the energy of a body executing S.H.M. assuming that the energy of the body depends upon (a) the mass ***m*** (b) the frequency *v* and (c) the amplitude of vibration α. (3)

Q9 .(i) Define one light year and express it in terms of kilometer.(ii) Check the correctness of the relation: **$h = r\rho g/2S\cos\theta$** where ρ denotes density, g is acceleration due to gravity , r is radius of the tube, h is height of liquid in the column and S is surface tension of the liquid.

(Given: Surface tension is defined as Force / length) (1+2=3)

Q10. Liquid is flowing steadily a pipe. Assume that the volume of the liquid flowing out per second depends on

(*a*) the coefficient of viscosity of the liquid (η)

(*b*) the radius of the pipe (*r*) and (c) the pressure gradient along the pipe (pressure gradient is drop in pressure per unit length of the pipe, and is equal to P/*l*, where P is the difference between the ends of the pipe and *l* is the length of the pipe). The dimensions of viscosity is $[ML^{-1}T^{-1}]$. Deduce by the method of dimensions, the formula for the volume of the liquid flowing out per second. (3)