Roll. No………………………… 1211022

Diploma in Engg./Integrated B.Tech 1st Semester Examination


Subject - PHYSICS – I

Subject Code – AHL001

Time Allowed: 03 hours.             Maximum Marks: 100

Before answering the question paper the candidate should ensure that they have been supplied the correct question paper. Complaints in this regard, if any, shall not be entertained after the examination.

Note: Attempt any five questions and all questions carry equal marks.

Section – A

1. (a) What is principle of homogeneity of dimensions? Give uses and limitations of dimensional analysis. Using dimensional analysis check the correctness of the following equation-

   \[ S = Ut + \frac{1}{2} at^2 \]

   (b) State and prove parallelogram law of vector addition.

   (c) Differentiate \( x \sin x \) w.r.t. \( x \).              (10, 5, 5)

2. (a) What do you mean by banking of roads? Derive an expression for the angle of banking.

   (b) A body is projected with initial velocity \( v \) at angle \( \theta \) with the horizontal. Show that its trajectory is parabola. Derive an expression for the maximum height attained. A projectile is projected with a speed of 30 m/s at an angle 30º to the vertical. Calculate the maximum height it will reach. (10, 10)

3. (a) State and prove law of conservation of energy. Give two examples of it.

   (b) Determine work done against friction when

   i) A body moves over a horizontal surface.

   ii) A body moves up an inclined plane.

   (10, 10)

Section – B

4. (a) Define stress and strain and hence state Hooke’s law. Discuss the variation of strain with stress and hence define the elastic limit.

   (b) What is a cantilever? Derive an expression for the depression at the loaded end of a rectangular cantilever of negligible weight.

   (10, 10)

5. (a) Define heat and temperature on the basis of kinetic theory of matter. What are different scales of temperature? Write relationship between all of them. At what temperature both Fahrenheit and Celsius scales will give same reading of temperature.

   (b) Describe the principle, construction and working of a platinum resistance thermometer. Give its merits and demerits.

   (10, 10)

6. (a) Explain the construction, working and magnifying power of Astronomical telescope.

   (b) What do you mean by acoustic of buildings? Explain.

   (c) What is total internal reflection? Explain with proper ray diagram. Give the necessary conditions for the total internal reflection to take place.

   (10, 5, 5)