Premier University
Department of Computer Science & Engineering
1st Semester Final Examination, Spring 2021
Course Code: PHY 101 Course Title: Engineering Physics I

Time: 1.5 hours **Full Marks: 37.5**

NB: Answer any of three (3) from following four (4) questions.
Each question carries equal marks.

Q.1 **a.** Derive Clapeyron latent heat equation $\frac{dP}{dT} = \frac{L}{T(V_2 - V_1)}$,where the symbols have their usual meaning. **7**

b. Find the increase in the boiling point of water at 100^0C when the pressure is increased by one atmosphere. Latent heat of vaporization of steam is 540cal/gram and 1gram of steam occupies a volume of 1677cm^3. **5.5**

Q.2 Established Maxwell's thermodynamics relations are **6.5 +6**

(i) $\left(\frac{\partial H}{\partial V}\right)_T = T\left(\frac{\partial P}{\partial T}\right)_V$ and

(ii) $\left(\frac{\partial H}{\partial P}\right)_T = -T\left(\frac{\partial V}{\partial T}\right)_P$.

Q.3 **a.** Write down the physical significance of entropy. **2.5**

b. Show that the entropy remains constant in a reversible process. **5**

c. Calculate the change in entropy in when 5 kg of water at 100^0C is converted into steam at the same temperature (Latent heat of steam 540cal/gram). **5**

Q.4 **a.** According to Doppler effect find the frequency change when **4+4**

(i) The source and the observer move towards each other.

(ii) The source and the observer move away from each other.

b. A motor car sounding a horn at a frequency of 100Hz moves away at a stationary observer towards a rigid flat wall with a velocity of 36 km/hr. How many beats per second will be heard by the observer.[Velocity of sound in air 350ms^{-1}] **4.5**