University of Information Technology & Sciences (UITS)

Faculty of Science and Engineering

Department of Computer Science & Engineering

Term Final Examination, Autumn -2022

Course Title: Engineering Physics

Course Code: PHY 175

Marks: 50 (Answer **all** the questions) **Time: 3 Hours**

1. a) Discuss the postulates of kinetic theory of gases. [2]
   b) Deduce the pressure in a plane exerted by the gas molecules confined in a cubic container. [5]
   c) Calculate the RMS velocity of the Oxygen molecule at 127°C. [3]

2. a) Discuss resolving power of a diffraction grating. [2]
   b) Formulate the expression of the wavelength of beam using a diffraction grating. [5]
   c) Diffraction patter of a single slit of width 1 cm is formed by a lens of focal length 50 cm. Calculate the distance between the first dark and the next bright fringe from the axis. Given that the wavelength of the light is 500 nm. [3]

3. a) Deduce Clapeyron latent heat equation. [3]
   b) Show that the work done in a Carnot engine is the area trapped by a complete cycle. [4]
   c) Calculate the boiling point of Toluene under a pressure of 80 cm mercury. The normal boiling point is 100°C. Latent heat of the vaporization is 400 joules/gm. Density of the vapor at the boiling point is 5 g/liter and that of the liquid 0.8 g/cm^2. [3]

4. a) Discuss entropy with its significances. [2]
   b) Briefly explain Temperature-Entropy diagram. [4]
   c) 80g of water at 0°C is mixed with an equal mass of water at 83°C. Calculate the resultant increase in entropy. [4]

5. a) Briefly explain a wave equation that is in damping mode with a periodic nature having constructing a suitable wave equation Mathematically. [3]
   b) Formulate the equation of a system of two objects under oscillation across the length of the spring (assume that objects are connected with a spiral spring). [4]
   c) Two objects of mass 400g and 800g are connected with a spiral spring of spring constant 12 N/cm. The objected are under oscillation. Calculate the reduced mass of the system and time period of the oscillation. [3]