

- Q. 6. (a) For a wave travelling through a medium, demonstrate that the total energy per unit volume is always equal to one half the kinetic and one half the potential energy. (10)
- (b) The longitudinal waves can pass through solids. How it is possible and on what parameters the velocity of such waves will depend? (06)
- (c) The angular Vibrational frequency of CO molecule is $0.6 \times 10^{15} \text{ s}^{-1}$. Calculate the amount of work required for stretching it by 0.5 \AA from the equilibrium position. (04) (20)
- Q. 7. (a) An ideal gas is enclosed in a cylinder with movable piston. Calculate the work done on such gas and show that pressure force is non-conservative. (10)
- (b) State and briefly explain the intermolecular forces. (06)
- (c) Oxygen gas having a volume of 1130 cm^3 at 42°C and a pressure of 101 kPa expanded until its volume is 1530 cm^3 and its pressure is 106 kPa . Find the number of moles of oxygen in the system and its final temperature. (04) (20)
- Q. 8. Write short notes on any TWO of the following. (10 each) (20)
- a. Kepler's Law of Periods
 - b. Michelson interferometer
 - c. Young's double slit experiment
