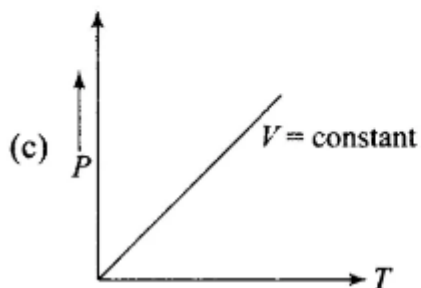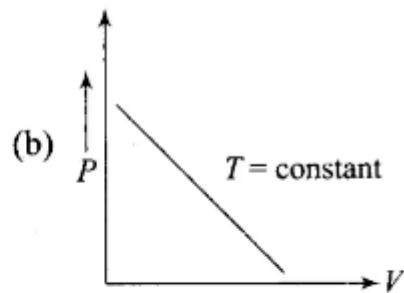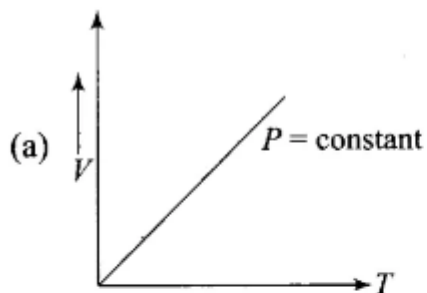**National Institute of Open Schooling**
Senior Secondary Course: Physics
Lesson 10: Kinetic Theory of Gases
Worksheet -10

1. Under different conditions of temperature, pressure and volume, gases exhibit different properties. Observe your surroundings and write different properties of gases under different conditions. For example, at room temperature, atoms/molecules have finite thermal energy. If thermal energy increases, molecules begin to move more freely.

2. The term temperature and heat are often used interchangeably in everyday language. In Physics, however, is there any difference between temperature and heat?

   a) If Yes, Support your answer with reasons.
   b) If No, Support your answer with reasons.

3. Take some objects from your surroundings of same mass and supply same quantity of heat to all objects. You will observe that the rise in temperature is found to be different in different solids in spite of having the same mass and being supplied the same quantity of heat. Why it is so? Support your observations with suitable reasons. Also write the expression for amount of heat required to raise the temperature of a substance.

4. Explain Principle of Calorimetry. Find the temperature of the mixture if a piece of copper weighing 500 g is heated to $100^0\,C$ and dropped into 200g of water at $25^o C$. The specific heat of Cu is 0.42 joule/gram °C.

5. Which of the following graph diagrams depicts ideal gas behaviour?

6. What you understand by an ideal gas? A cylinder containing an ideal gas is in vertical position and has a piston of mass M that is able to move up or down without friction as given in figure below
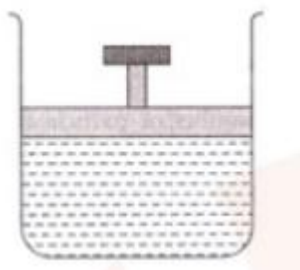
What will be the impact of temperature increase on pressure and volume of gas and why?

7. A mass of gas occupies 200 cm^3 at a temperature of 27°C and a pressure of 100 kPa. Calculate the volume when:
    a) The pressure is doubled at constant temperature.
    b) The absolute temperature is doubled at constant pressure.
    c) The pressure is increased to 150 kPa and the temperature is 127°C.

8. Neon is a monatomic gas in which inter-molecular forces are extremely weak. 1.00 kg of neon gas has a density of 0.828 kgm^{-3} at a pressure of 100 kPa and temperature of 293 K. Calculate:
    a) Average kinetic energy of each gas molecule
    b) Total kinetic energy of the gas
    c) Root-mean-square speed

9. Suppose you want to fill a pressurized tank with a volume of 4.00 L with oxygen-enriched air for use in diving, and you want the tank to contain 50.0 g of O_2 and 150 g of N_2. What will be the total gas pressure in the tank at 25°C?

10. Define specific heat, specific heat at constant volume (C_v) and specific heat at constant pressure (C_p). Also drive relationship between C_p and C_v