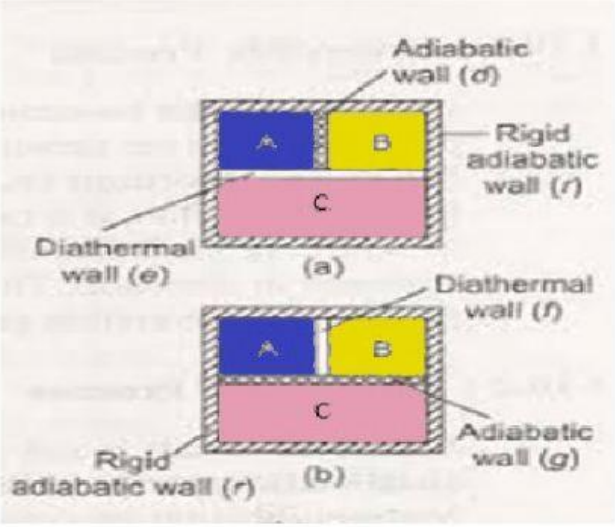
# CASE BASED -THERMODYNAMICS

GRADE :11 SUBJECT -PHYSICS

In general, whether or not a system is in a state of equilibrium depends on the surroundings and the nature of the wall that separates the system from the surroundings. Consider two gases A and B occupying two different containers. We know experimentally that pressure and volume of a given mass of gas can be chosen to be its two independent variables. Let the pressure and volume of the gases be (PA , VA ) and (PB , VB ) respectively. Suppose first that the two systems are put in proximity but are separated by an adiabatic wall – an insulating wall (can be movable) that does not allow flow of energy (heat) from one to another. The systems are insulated from the rest of the surroundings also by similar adiabatic walls. The situation is shown schematically in Fig.( a)



In this case, it is found that any possible pair of values (PA , VA ) will be in equilibrium with any possible pair of values (PB , VB ). Next, suppose that the adiabatic wall is replaced by a diathermic wall. It is then found that the macroscopic variables of the systems A and B change spontaneously until both the systems attain equilibrium states. After that there is no change in their states. The situation is shown in Fig. (b). The pressure and volume variables of the two gases change to (PB ', VB ') and (PA ', VA ') such that the new states of A and B are in equilibrium with each other. There is no more energy flow from one to another. We then say that the system A is in thermal equilibrium with the system B.

1. Which among the following statement does follow Zeroth law of thermodynamics ?

a) When a body '*A*' is in thermal equilibrium with another body 'B', and also separately in thermal equilibrium with a body '*C*', then body 'B' and '*C*' will also be in thermal equilibrium with each other.

b) When a body '*A*' is in thermal equilibrium with another body 'B', and also separately in thermal equilibrium with a body '*C*', then body 'B' and '*C*' are said to be at same temperature.

c) When a body '*A*' is in thermal equilibrium with another body 'B', and also separately in thermal equilibrium with a body '*C*', then body 'B' and '*C*' are said to be not in thermal equilibrium with each other.

d) When a body '*A*' is in thermal equilibrium with another body 'B', and also separately in thermal equilibrium with surrounding C, then body 'B' and '*C*' will also be in thermal equilibrium with each other.

2.Temperature of bodies in thermal equilibrium will be

a)same

b)High

c)zero

d)Infinite

3.Adiathermic wall as mentioned in the paragraph above is

a) a non conducting wall that does not allows energy flow (heat) from one to another

b) a conducting wall that allows energy flow (heat) from one to another

c) a conducting wall that does not allows energy flow (heat) from one to another

d) an insulating wall that allows energy flow (heat) from one to another.

e) an insulating wall that does not allows energy flow (heat) from one to another

4. The macroscopic variables of the thermodynamic systems are

a)Enthalpy

b)Pressure

c)Volume

d) Both Pressure and Volume only

e)All a,b and c