

05

Quiz-I/ PH207/ Full Marks: 10/ Time: 35 minutes/ September 7 2023

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1. An adiabatic chamber with rigid walls consists of two compartments, one containing a gas and the other complete vacuum. The partition between the two is suddenly removed. Is the work done during an infinitesimal portion of this process equal to  $p dV$ ,  $p, V$  the pressure and volume, respectively? [2]

During the process  $\Delta q = 0$   $\Delta U = \Delta W$  [ ]  
 Since it is an infinitesimal portion of process, the process is quasi static, so work done during that portion is  $P dV$  [ ]

2. Why the room having a refrigerator is usually warmer than other rooms? Explain using direction of heat flow. [2]

Due to the conversion of work to heat, the room having a refrigerator is warmer than other rooms.

3. Consider a valley with temperature  $T_m < T_v$  blows into the valley and gets trapped. Explain. [2]

$T_v$  decreases during the process, consider the valley as a system, with volume  $V$ , new cold air of volume  $V_c$  is added to the system.

~~$P(T_m + V_c) = nRT$~~