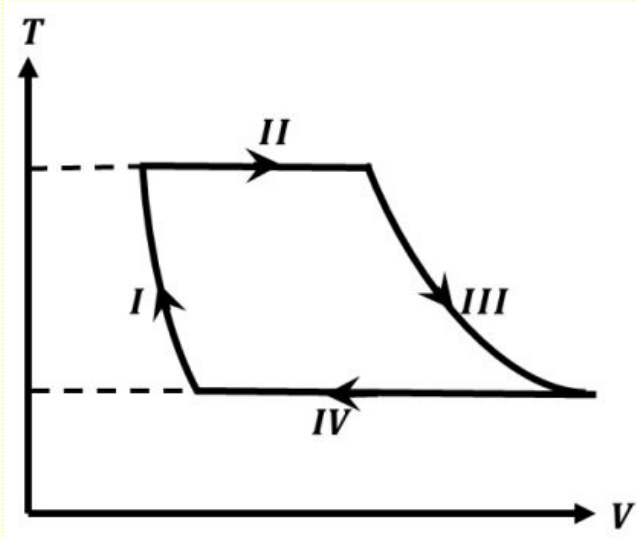


One mole of a monatomic ideal gas undergoes a cyclic process as shown in the figure (where  $V$  is the volume and  $T$  is the temperature). Which of the statements below is (are) true?



- (A) Process I is an isochoric process
- (B) In process II, gas absorbs heat
- (C) In process IV, gas releases heat
- (D) Processes I and III are not isobaric

**Solution**

Let us check each option one by one.

(A) Volume is changing in process I, so it can not be isochoric.

(B) Process II is isothermal process, so internal energy cannot change. Since volume is increasing, work is done by the system. This is only possible if heat is absorbed by the system as  $\Delta Q = \Delta W$ . [Option (B) is correct]

(C) Process IV is isothermal process, so internal energy cannot change. Since volume is decreasing, work is done on the system. This is only possible if heat is released by the system as  $-\Delta Q = -\Delta W$ . [Option (C) is correct]

(D) Isobaric process has T-V graph as straight line ( $\because V \propto T$ ). Since I & III are not straight lines, they are not isobaric. [Option (D) is correct]

Hence, Options (B), (C) & (D).

[Based on JEE Adv. 2018 - [123IITJEE](#)]