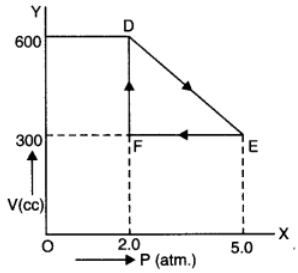
Question 12. 9 A thermodynamic system is taken from an original state to an intermediate state by the linear process shown in Fig.Its volume is then reduced to the original value from E to F by an isobaric process. Calculate the total work done by the gas from D to E to F.

Answer:



As is clear from Fig.

Change in pressure, $\Delta P = EF = 5.0 - 2.0 = 3.0$ atm $= 3.0 \times 10^5$ Nm^{-2}

Change in volume, $\Delta V = DF = 600 - 300 = 300$ cc $= 300 \times 10^{-6}$ m^3

Work done by the gas from D to E to F = area of ΔDEF

$$W = \frac{1}{2} \times DF \times EF$$

$$= \frac{1}{2} \times (300 \times 10^{-6}) \times (3.0 \times 10^5) = 45 \text{ J}$$

Question 12. 10 A refrigerator is to maintain eatables kept inside at 9 °C, if room temperature is 36 °C. Calculate the coefficient of performance.

Answer:

Here, $T_1 = 36\ ^\circ\text{C} = (36 + 273)\ K = 309\ K$

$T_2 = 9\ ^\circ\text{C} = (9 + 273)\ K = 282\ K$

Coefficient of performance, $E = \frac{T_2}{T_1 - T_2} = \frac{282}{309 - 282} = \frac{282}{27} = 10.4.$

********** END **********