

MM 209 – Tutorial 1 – Batch B

PLEASE ANSWER THESE QUESTIONS ON PAPER HANDWRITTEN, SCAN IT PROPERLY AND SUBMIT THEM AS ONE PDF FILE

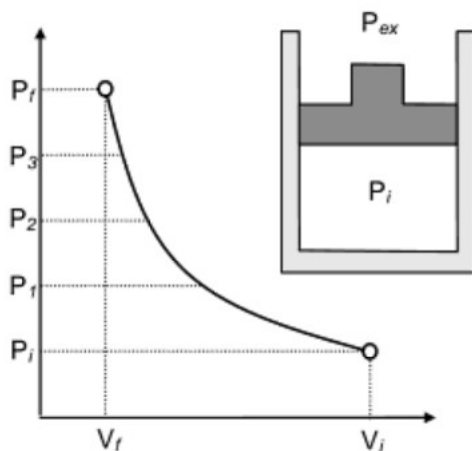
IN EACH PAGE CLEARLY WRITE (YOUR HAND WRITING) YOUR ROLL NUMBER, NAME AND YOUR GROUP INFORMATION (A or B) AT THE CENTRE OF PAGE (NOT AT THE TOP OR BOTTOM).

- 1) Evaluate the line integral $\int_{AB} (x + y) dx + x dy$

Along two paths of integration

- AB is the line segment connecting A(0,0) to B(1,1)
- AB is a parabola $y = x^2$ from A(0,0) to B(1,1)
- Do you think the integral is path independent? What is the condition the terms in the integral equation needs to satisfy that the integral is path independent?

2)



The gas shown in the figure on the left is compressed by pushing the piston against the internal pressure P_i . Determine the work done on the cylinder for the following paths (Show it schematically)

- P_{ext} is suddenly increased to P_f
- P_{ext} is increased to P_1 and then to P_f
- P_{ext} is increased to P_1 , P_2 and then to P_f
- P_{ext} is increased to P_1 , P_2 , P_3 and then to P_f
- P_{ext} increases in such a manner that it is always infinitesimally larger than the pressure inside the cylinder.

- 3) Verify the triple product rule for the equation of state for ideal gas