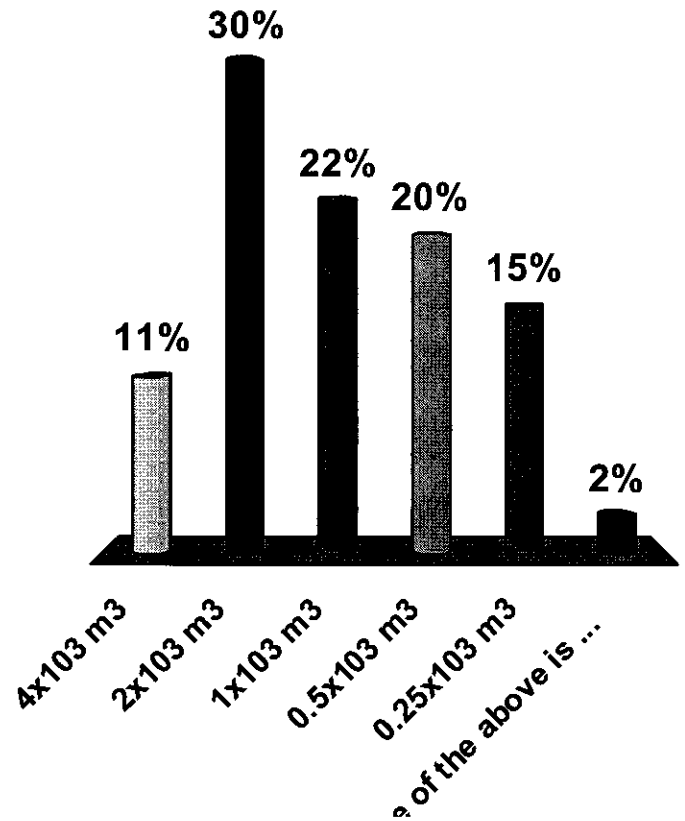
If a gas filled weather balloon has volume of 10^3 m^3 at a launch temperature of 300 Kelvins and a pressure of 1 atm., what is its volume at altitude where the pressure is 0.5 atm. and the temperature is 150 Kelvins?

1. $4x10^3$ m^3
2. $2x10^3$ m^3
3. $1x10^3$ m^3
4. $0.5x10^3$ m^3
5. $0.25x10^3$ m^3
6. None of the above is correct within 10%.



The volume remains the same, so that the correct answer is #3: 10^3 m^3

- Apply the Ideal Gas Law at the initial and final conditions:
- **$P_iV_i = cT_i$; and $P_fV_f = c\ T_f\ T_f$**
- Then the ratio yields:

  $(P_f/P_i)(V_f/V_i) = (c/c)(T_f/T_i)$,
- Or $(0.5/1.0)(V_f/V_i) = 1(150/300)$,
- So that $(V_f/V_i) = 0.5/0.5 = 1.0$, and
- **$V_f = V_i = 10^3$ m^3 (#3)**