Assignment 4

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2019-02-27, 23:59 IST.

1) The PVT relationship for an gas is given as $P(V - b) = RT$. For this gas $\frac{\partial V}{\partial P}$ equals

- $\frac{R}{P}$
- $\frac{RT}{P}$
- $\frac{RT}{V - b}$
- $\frac{R}{V}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
- $\frac{R}{P}$

2) The PVT relationship for an nitrogen is given as $P(V - b) = RT$. For nitrogen, the constant $b = 38.7 \times 10^{-6} m^3 mol^{-1}$. It undergoes an isothermal compression at 300 K from 1 bar to 11 bar. The enthalpy change (in J) for this process, rounded to one digit after the decimal is ___________
No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 38.6,38.8

The change in entropy (in J mol\(^{-1}\) K\(^{-1}\)) for the process in question 2, rounded to one digit after the decimal is ________________

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) -20,-19.8

4) Consider the following thermodynamic diagram for refrigerant R134a.

At 280 K, the saturation pressure is 3.9 bar. The enthalpy of vaporization (in kJ kg\(^{-1}\), rounded to nearest integer) for R134a at 280 K is ________________.

*Hint:* Enthalpy of vaporization is difference between enthalpies of the vapor and that of the liquid

No, the answer is incorrect.
5) A steam turbine operates reversibly and adiabatically. It takes superheated steam at 20 bar and discharges saturated vapour at 1 bar. If the steam is fed to the turbine at a rate of 10 kg s\(^{-1}\), the absolute value of the power output from the turbine (in kJ s\(^{-1}\), rounded to the nearest integer) is ____________.

**Hint:**
- *If the process is reversible and adiabatic, it is isentropic. For such a process, the entropy at the inlet and exit are equal!*
- *Since the process is adiabatic (\(\dot{Q}_0\)), rate of work (i.e. the power) output will equal the rate of total enthalpy change (i.e. \(\dot{m}\Delta H\)).*