

國立臺北科技大學 111 學年度碩士班招生考試

系所組別：3401 資源工程研究所

第一節 基礎熱力學 試題 (選考)

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注意事項：

1. 本試題共 10 題，每題 10 分，共 100 分。
2. 不必抄題，作答時請將試題題號及答案依照順序寫在答案卷上。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. The number of ways in which the particles can be distributed in space is related to the concept of the thermodynamic property:
(A) Thermal entropy
(B) Degree of mixed-up-ness
(C) Enthalpy
(D) Configuration entropy
2. Which activity coefficient is an indication of a eutectoid solid solution?
(A) 0
(B) 0.5
(C) 1.0
(D) 1.5
3. The enthalpy of PbO is -219KJ/mole at 298K. ΔC_p of the reaction $\text{Pb} + 1/2\text{O}_2 \rightarrow \text{PbO}$ is 10J/mole-K for $T=298-500\text{K}$. What is ΔH for the reaction at 398K?
(A) -218 KJ
(B) $-10\ln(398/298)$ J
(C) 1000 J
(D) 1500 J
(E) Not available from the provided data
4. Indicate the wrong statement for the properties of ideal gas
(A) no heat needed in an isothermal reversible expansion process
(B) internal energy does not depend on pressure
(C) internal energy does not depend on volume
(D) internal energy depends only on the temperature

- (E) No intermolecular interaction
5. The entropy of a system contained in an adiabatic enclosure
(A) decreases during a reversible process
(B) increases during a reversible process
(C) decreases during an irreversible process
(D) increases during an irreversible process
(E) none of the above
 6. For an ideal gas, $PV^\gamma = 210.3$, where $\gamma = C_p/C_v$. After a reversible adiabatic process, the pressure of system reduces from 20 atm to 4 atm. The work is ___ L atm.
(A) 28.6
(B) 37.1
(C) 49.5
(D) 58.5
(E) 68.9
 7. The normal boiling temperature of iron is 3330 K. The rate of change of the vapor pressure of liquid iron with temperature is 3.72×10^{-3} atm/K. The molar latent heat of boiling of iron at 3330 K is ___ J.
(A) 3423764
(B) 342376.4
(C) 34237.64
(D) 3423.764
(E) 342.3764
 8. Gas constant is NOT
(A) $8.314 \text{ J K}^{-1}\text{mol}^{-1}$
(B) $8.63 \times 10^5 \text{ eV K}^{-1}\text{mol}^{-1}$
(C) $5.19 \times 10^{19} \text{ eV K}^{-1}\text{mol}^{-1}$
(D) $1.987 \text{ cal K}^{-1}\text{mol}^{-1}$
(E) $0.082 \text{ L atm K}^{-1}\text{mol}^{-1}$

注意：背面尚有試題

9. Oxygen gas stored at a pressure of 200 atm at 300 K in a cylindrical vessel of diameter 0.2 meters and height 2 meters. The van der Waals constant for oxygen are $a = 1.36 \text{ L}^2\text{atm/mole}^2$ and $b = 0.0318 \text{ L/mole}$. The mole of oxygen gas in a cylinder vessel is ___ moles.
- (A) 565
 - (B) 353
 - (C) 232
 - (D) 141
 - (E) 102
10. Which one of the following descriptions on the reversible heat transfer is correct?
- (A) Reversible heat flow is degraded as a maximum work performed in a system.
 - (B) The heat transfer is so fast that the system remains in equilibrium throughout the process.
 - (C) The process from an initial state to a final state can be returned when a maximum work is performed.
 - (D) The system or the surroundings suffer an overall change.