Arjuna NEET (2024)

Thermodynamics

DPP-04

1. The maximum work obtained by an isothermal reversible expansion of 1 mole of an ideal gas at 27°C from 2.24 to 22.4 L is (R = 2 cal K^{-1} mol^{-1})
(1) – 1381.8 cal (2) – 600 cal
(3) – 138.18 cal (4) – 690.9 cal

2. 2 mole of an ideal gas at 27°C expands isothermally and reversibly from a volume of 4 litres to 40 litres. The work done (in kJ) is:
(1) $w = -28.72$ kJ (2) $w = -11.488$ kJ
(3) $w = -5.736$ kJ (4) $w = -4.988$ kJ

3. The work done on the system when one mole of an ideal gas at 500 K is compressed isothermally and reversibly to $\frac{1}{10}^{th}$ of its original volume (R = 2 cal)
(1) 500 kcal (2) 15.1 kcal
(3) 25.03 kcal (4) 2.303 kcal

4. The internal energy change when a system goes from state A to B is 40 kJ/mol. If the system goes from A to B by a reversible path and returns to state A by an irreversible path. What would be the change in internal energy?
(1) 40 kJ (2) > 40 kJ
(3) < 40 kJ (4) Zero

5. One mole of oxygen is allowed to expand isothermally and reversibly from 5 m^3 to 10 m^3 at 300 K. Calculate work done in expansion of gas.
(1) – 172.89 J (2) 1728.98 J
(3) – 1728.98 J (4) 172.89 J

6. Two moles of an ideal monoatomic gases are allowed to expand adiabatically and reversibly from 300K to 200 K. The work done in the system is (C_V = 12.5 J/K mol)
(1) – 12.5 kJ (2) – 2.5 kJ
(3) – 625 kJ (4) 500 kJ

7. Adiabatic expansion of ideal gas into vacuum correspond to:
(1) $w = 0$ (2) $\Delta E = 0$
(3) $\Delta H = 0$ (4) All of these

8. The relation of internal energy, enthalpy and work done can be represented by
(1) $\Delta E = \Delta H + W$
(2) $\Delta E = W - \Delta H$
(3) $\Delta H = \Delta E + W$
(4) $W = \Delta E + \Delta H$

9. A gas expands isothermally against a constant external pressure of 1 atm from a volume of 10 dm^3 to a volume of 20 dm^3. It absorbs 800 J of thermal energy from its surroundings. The ΔU is
(1) – 312 J (2) + 123 J
(3) – 213 J (4) + 231 J

10. The work done in adiabatic process on ideal gas by a constant external pressure would be
(1) Zero
(2) ΔE
(3) ΔH
(4) ΔG

11. A system absorb 20 kJ heat and does 10 kJ work then internal energy of system will be–
(1) Decreases by 10 kJ
(2) Increases by 10 kJ
(3) Increases by 30 kJ
(4) Decreases by 30 kJ

12. 5 mol of ideal gas expands isothermally and irreversibly from a pressure of 10 atm to 1 atm against constant external pressure of 1 atm work at 300 K will be:
(1) – 15.921 kJ
(2) – 11.224 kJ
(3) – 110.83 kJ
(4) None of these

13. Match the column:

Column-I		Column-II	
a.	Adiabatic process	i.	$q = 0$
b.	Isothermal process	ii.	$\Delta H = 0$
c.	Isoenthalpic process	iii.	$\Delta T = 0$
d.	Isoentropic process	iv.	$\Delta S = 0$

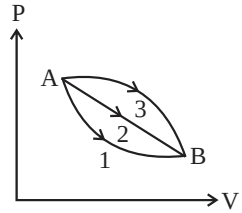
(1) a-i, b-iv, c-ii, d-iii
(2) a-ii, b-i, c-iv, d-iii
(3) a-i, b-iii, c-ii, d-iv
(4) a-i, b-iii, c-iv, d-ii

14. Which of the following is correct for free expansion of ideal gas under isothermal condition:
(1) $q = 0, \Delta T < 0, w < 0$
(2) $q = 0, \Delta T = 0, w = 0$
(3) $q \neq 0, \Delta T = 0, w = 0$
(4) $q \neq 0, \Delta T = 0, w \neq 0$

15. An ideal gas receives 10 J of heat in a reversible isothermal expansion. Then the work done by the gas:
(1) Would be more than 10 J
(2) 10 J
(3) Would be less than 10 J
(4) Cannot be determined

16. Net work done by the system in a cyclic process is equal to:
(1) Zero (2) ΔU
(3) ΔH (4) q

17. A given mass of gas expands from the state A to the state B by three paths 1, 2 and 3 as shown in the figure. If w_1, w_2, and w_3 respectively be the magnitudes work done by the gas along three paths then:



(1) $w_1 > w_2 > w_3$ (2) $w_1 < w_2 < w_3$
(3) $w_1 = w_2 = w_3$ (4) $w_2 < w_3 < w_1$

18. For monoatomic ideal gas, the exact value of the ratio of $C_{p,m}$ and $C_{v,m}$ is:
(1) $\frac{5}{3}$ (2) $\frac{7}{5}$
(3) $\frac{9}{7}$ (4) $\frac{9}{11}$

19. For two mole of an ideal gas
(1) $C_v - C_p = R$ (2) $C_p - C_v = 2R$
(3) $C_p - C_v = R$ (4) $C_v - C_p = 2R$

20. For which of the following reactions, ΔH is equal to ΔU?
(1) $2HI(g) \rightarrow H_2(g) + I_2(g)$
(2) $2SO_2(g) + O_2(g) \rightarrow 2SO_3(g)$
(3) $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$
(4) $2NO_2(g) \rightarrow N_2O_4(g)$

21. The value of enthalpy change (ΔH) for the reaction $C_2H_5OH(l) + 3O_2(g) \rightarrow 2CO_2(g) + 3H_2O(l)$ at 27°C is –1366.5 kJ mol^{-1}. The value of internal energy change for the above reaction at this temperature will be:
(1) – 1371.5 kJ (2) – 1369.0 kJ
(3) – 1364.0 kJ (4) – 1361.5 kJ

22. One mole of a non-ideal gas undergoes a change of state (2.0 atm, 3.0 L, 95 K) $\rightarrow$ (4.0 atm, 5.0 L, 245 K) with a change in internal energy, ΔU = 30.0 L atm. The change in enthalpy (ΔH) is the process in L atm is:
(1) 40.0
(2) 42.3
(3) 44.0
(4) Not defined, because process is not constant

23. The temperature of 2 moles of an ideal gas is raised from 27°C to 77°C. What is the value of $\Delta H - \Delta U$ for the process?
($R = 8.3\ J\ K^{-1}mol^{-1}$)
(1) 415 J (2) 830 J
(3) 1660 J (4) None of these

24. Enthalpy is:
(1) State function (2) Extensive
(3) None of them (4) Both (1) and (2)

Note: Kindly find the Video Solution of DPPs Questions in the DPPs Section.

Answer Key

1.	**(1)**	**13.**	**(3)**
2.	**(2)**	**14.**	**(2)**
3.	**(4)**	**15.**	**(2)**
4.	**(4)**	**16.**	**(4)**
5.	**(3)**	**17.**	**(2)**
6.	**(2)**	**18.**	**(1)**
7.	**(4)**	**19.**	**(2)**
8.	**(1)**	**20.**	**(1)**
9.	**(3)**	**21.**	**(3)**
10.	**(2)**	**22.**	**(3)**
11.	**(2)**	**23.**	**(2)**
12.	**(2)**	**24.**	**(4)**

PW Web/App - https://smart.link/7wwosivoicgd4

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