

PART 1 - CHEMISTRY

Topic : Thermodynamics

SECTION-A : (Maximum Marks : 8)

This section contains **TWO** questions.

Each question has **TWO** lists: **List-I** and **List-II**.

Four options are given representing matching of elements from List-I and List-II. **ONLY ONE** of these four options corresponds to a correct matching.

For each question, choose the option corresponding to the correct answer.

Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +4 If **ONLY** the correct option is chosen;

Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered);

Negative Marks : -1 In all other cases.

1. An ideal gas (0.5 mol), initially at 2 bar pressure, is compressed at a constant temperature of 600 K in two steps: first, against a constant external pressure of P bar ($2 < P < 8$), and then against constant external pressure of 8 bar. At each step, the compression is stopped only when the pressure of the gas becomes equal to the external pressure. The total work done on the gas in these steps is W . Considering all possible values of P ($2 < P < 8$) and taking the gas constant as R (in $\text{J K}^{-1} \text{mol}^{-1}$), the minimum value of $|W|$ (in J) is

[JEE Advanced 2026 Paper 1]

(A) 207R

(B) 600R

(C) 630R

(D) 900R

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2. **List-I** contains various physical/chemical processes, and **List-II** contains combinations of changes in enthalpy (ΔH) and entropy (ΔS). Match each entry in **List-I** to the appropriate entry in **List-II**, and choose the correct option.

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List-I		List-II	
P.	Physisorption	1.	$\Delta H > 0$ and $\Delta S > 0$
Q.	Diamond $\longrightarrow$ Graphite	2.	$\Delta H < 0$ and $\Delta S < 0$
R.	Denaturation of protein	3.	$\Delta H < 0$ and $\Delta S = 0$
S.	Propene $\longrightarrow$ Cyclopropane	4.	$\Delta H > 0$ and $\Delta S < 0$
		5.	$\Delta H < 0$ and $\Delta S > 0$

(A) $P \rightarrow 2$; $Q \rightarrow 3$; $R \rightarrow 5$; $S \rightarrow 4$ (B) $P \rightarrow 4$; $Q \rightarrow 3$; $R \rightarrow 5$; $S \rightarrow 1$ (C) $P \rightarrow 2$; $Q \rightarrow 5$; $R \rightarrow 1$; $S \rightarrow 4$ (D) $P \rightarrow 2$; $Q \rightarrow 5$; $R \rightarrow 1$; $S \rightarrow 3$

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Space for Rough Work

SECTION-B : (Maximum Marks : 8)

This section contains **TWO** questions.

The answer to each question is a **NUMERICAL VALUE**.

For each question, enter the correct numerical value of the answer (in decimal notation, truncated / rounded-off to the **SECOND DECIMAL PLACE**; e.g. 6.25, 7.00, -0.33, -.30, 30.27, -127.30) in the place designated to enter the answer.

Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +4 If **ONLY** the correct answer is entered;

Zero Marks : 0 In all other cases.

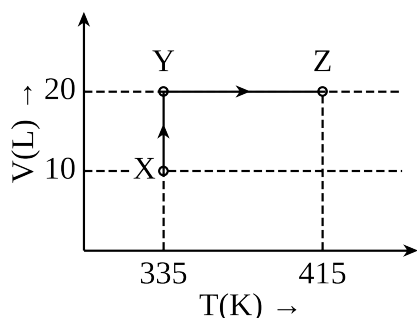
3. Considering ideal gas behavior, the expansion work done (in kJ) when 144 g of water is electrolyzed completely under constant pressure at 300 K is _____.

Use: Universal gas constant (R) = $8.3 \text{ J K}^{-1} \text{ mol}^{-1}$; Atomic mass (in amu): $H = 1$, $O = 16$

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4. Consider the following volume–temperature (V – T) diagram for the expansion of 5 moles of an ideal monoatomic gas.



Considering only P- V work is involved, the total change in enthalpy (in Joule) for the transformation of state in the sequence $X \rightarrow Y \rightarrow Z$ is _____.

[Use the given data: Molar heat capacity of the gas for the given temperature range, $C_{V,m} = 12 \text{ J K}^{-1} \text{ mol}^{-1}$ and gas constant, $R = 8.3 \text{ J K}^{-1} \text{ mol}^{-1}$]

[JEE Advanced 2024 Paper 1]

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Space for Rough Work

JEE ADVANCED THERMODYNAMICS — PYQS

Test Pattern : JEE (Advanced)

ANSWER KEY

SECTION-A																			
Ques.	1	2																	
Ans.	B	C																	

SECTION-B									
Ques.	3		4						
Ans.	-29.95 to -29.8		8120						