PART 1 - CHEMISTRY

Topic : Thermodynamics

SECTION–1 : (Maximum Marks : 3)

- This section contains **ONE** question.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four options is the correct answer.
- 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	: +3	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 J K^{-1} mol^{-1}), the minimum value of |W| (in J) is [JEE Advanced 2026 Paper 1]

(A) 207R (B) 600R (C) 630R (D) 900R

Scan or tap for the full solution

Space for Rough Work

SECTION–2 : (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.

2. 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 J K^{-1} mol^{-1} ; Atomic mass (in amu): H = 1, O = 16

[JEE Advanced 2025 Paper 1]

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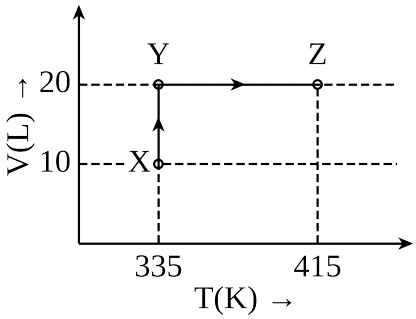
3. Consider the following volume−temperature (V−T) diagram for the expansion of 5 moles of an ideal monoatomic gas.



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 J K^{-1} mol^{-1} and gas constant, R = 8.3 J K^{-1} mol^{-1}] [JEE Advanced 2024 Paper 1]

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Space for Rough Work

SECTION–3 : (Maximum Marks : 4)

- This section contains **ONE** question.
- 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.

4. **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. [JEE Advanced 2026 Paper 1]

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 → 2; Q → 3; R → 5; S → 4
(B) P → 4; Q → 3; R → 5; S → 1
(C) P → 2; Q → 5; R → 1; S → 4
(D) P → 2; Q → 5; R → 1; S → 3

Scan or tap for the full solution

Space for Rough Work

JEE ADVANCED THERMODYNAMICS — PYQS

Test Pattern : **JEE (Advanced)**

ANSWER KEY

SECTION–1

Ques.	1
Ans.	B

SECTION–2

Ques.	2	3
Ans.	-29.95 to -29.8	8120

SECTION–3

Ques.	4
Ans.	C