

PART 1 - PHYSICS

Topic : Thermodynamics (physics)

SECTION-A : (Maximum Marks : 8)

This section contains **TWO** questions.

Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct answer(s).

For each question, choose the option(s) corresponding to (all) the correct answer(s).

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

Full Marks : +4 ONLY if (all) the correct option(s) is(are) chosen;

Partial Marks : +3 If all the four options are correct but ONLY three options are chosen;

Partial Marks : +2 If three or more options are correct but ONLY two options are chosen, both of which are correct;

Partial Marks : +1 If two or more options are correct but ONLY one option is chosen and it is a correct option;

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

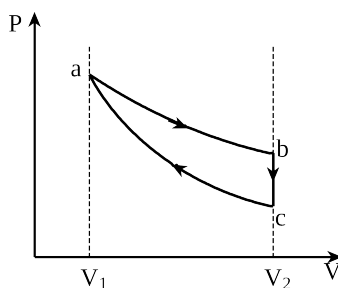
Negative Marks : -1 In all other cases.

For example, in a question, if (A), (B) and (D) are the ONLY three options corresponding to correct answers, then choosing ONLY (A), (B) and (D) will get +4 marks; choosing ONLY (A) and (B) will get +2 marks; choosing ONLY (A) and (D) will get +2 marks; choosing ONLY (B) and (D) will get +2 marks; choosing ONLY (A) will get +1 mark; choosing ONLY (B) will get +1 mark; choosing ONLY (D) will get +1 mark; choosing no option (i.e. the question is unanswered) will get 0 marks; and choosing any other combination of options will get -1 marks.

1. A quasi-static cycle of a monoatomic ideal gas contains an isothermal process (ab), followed by an isochoric process (bc) and an adiabatic process (ca) as shown in the figure. The volumes of the gas are V_1 and V_2 at a and b, respectively. If the cycle has heat input Q_{in} and output Q_{out} , then the efficiency of the cycle is defined as $\eta = \frac{Q_{in} - Q_{out}}{Q_{in}}$. The correct statement(s) is/are:

[Given: $\ln 2 \approx 0.7$]

[JEE Advanced 2026 Paper 1]



Space for Rough Work

- (A) If $V_2/V_1 = 8$, the heat released in the process bc is smaller than the heat absorbed in the process ab.
- (B) For a given value of V_2/V_1 , η does not depend on the temperature of the isothermal process.
- (C) If $V_2/V_1 = 8$, then the temperature of the gas at a is 4 times the temperature of the gas at c.
- (D) If $V_2/V_1 = 8$, then the pressure of the gas at a is 4 times the pressure of the gas at b.

Scan or tap for the full solution

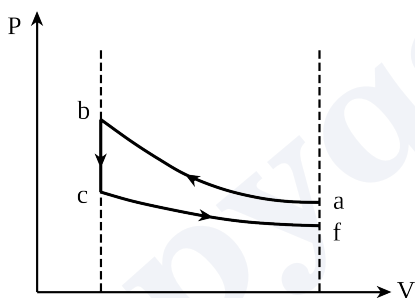


2. Ten moles of an ideal monoatomic gas, initially in state a at atmospheric pressure and temperature $T_a = 27^\circ\text{C}$, is enclosed in a metal cylinder of volume V_0 fitted with a frictionless piston. The gas is suddenly compressed to state b with volume $V_0/3$. Now, keeping the piston stationary, the cylinder is submerged in a water bath of temperature 11°C until the gas reaches the temperature of the water bath, which is denoted as state c. Finally, while still in the water bath, the piston is brought slowly to its initial position, which is denoted as state f. If R is universal gas constant, then the correct option(s) is/are:

[Given: $9^{1/3} = 2.08$]

[JEE Advanced 2026 Paper 2]

- (A) The schematic P-V diagram of the processes described above is:



- (B) The change in internal energy in going from state a to b is $4860R$.
- (C) The net change in the internal energy in the whole process is $-240R$.
- (D) The pressure and temperature of the state b are 2.08 times the atmospheric pressure and 624 K, respectively.

Scan or tap for the full solution



Space for Rough Work

SECTION-B : (Maximum Marks : 4)

This section contains **ONE** question.

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.

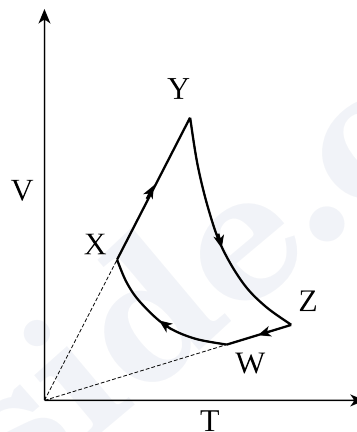
Answer to each question will be evaluated according to the following marking scheme :

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

Zero Marks : 0 In all other cases.

3. An ideal monatomic gas of n moles is taken through a cycle WXYZW consisting of consecutive adiabatic and isobaric quasi-static processes, as shown in the schematic V-T diagram. The volume of the gas at W, X and Y points are, 64 cm^3 , 125 cm^3 and 250 cm^3 , respectively. If the absolute temperature of the gas T_W at the point W is such that $nRT_W = 1 \text{ J}$ (R is the universal gas constant), then the amount of heat absorbed (in J) by the gas along the path XY is ____

[JEE Advanced 2025 Paper 2]



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**JEE ADVANCED THERMODYNAMICS (PHYSICS) —
THERMODYNAMIC PROCESSES (ISOTHERMAL,
ADIABATIC, ISOBARIC, ISOCHORIC) — PYQS**

Test Pattern : JEE (Advanced)

ANSWER KEY

SECTION-A

Ques.	1	2																
Ans.	A, B, C	A, B, C																

SECTION-B

Ques.	3																	
Ans.	1.6																	