

PART 1 - PHYSICS

Topic : Thermodynamics (physics)

SECTION-A : (Maximum Marks : 4)

This section contains **ONE** question.

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. The efficiency of a Carnot engine operating with a hot reservoir kept at a temperature of 1000 K is 0.4. It extracts 150 J of heat per cycle from the hot reservoir. The work extracted from this engine is being fully used to run a heat pump which has a coefficient of performance 10. The hot reservoir of the heat pump is at a temperature of 300 K. Which of the following statements is/are correct:

[JEE Advanced 2025 Paper 2]

(A) Work extracted from the Carnot engine in one cycle is 60 J.

(B) Temperature of the cold reservoir of the Carnot engine is 600 K.

(C) Temperature of the cold reservoir of the heat pump is 270 K.

(D) Heat supplied to the hot reservoir of the heat pump in one cycle is 540 J.

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 :

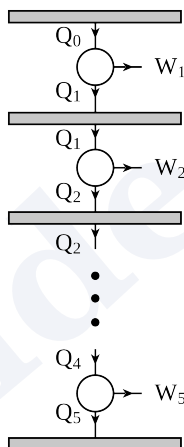
Full Marks : +4 If **ONLY** the correct answer is entered;

Zero Marks : 0 In all other cases.

2. As shown in the figure, five Carnot engines, each with efficiency η and same number of cycles per unit time, are operating between six heat reservoirs. The amount of heat released per cycle by one engine is completely absorbed by the next engine. Consider Q_0 to be the amount of heat absorbed per cycle by the first engine and W as the amount of total work done by all the engines per cycle, then the net efficiency of the system is found to be

$$\eta_{\text{net}} = \frac{W}{Q_0} = \frac{211}{243}. \text{ The value of } \eta \text{ is:}$$

[JEE Advanced 2026 Paper 1]



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Space for Rough Work

JEE ADVANCED THERMODYNAMICS (PHYSICS) — CARNOT ENGINE — PYQS

Test Pattern : JEE (Advanced)

ANSWER KEY

SECTION-A

Ques.	1																
Ans.	A, B, C																

SECTION-B

Ques.	2																
Ans.	0.32 to 0.34																