

NEET THERMODYNAMICS (PHYSICS) — THERMODYNAMIC PROCESSES (ISOTHERMAL, ADIABATIC, ISOBARIC, ISOCHORIC) — PYQS

Max. Marks: 72

Questions: 18

Section A (MCQ) — 18 questions

- Q.1** In an adiabatic expansion, the temperature of one mole of an ideal monatomic gas ($\gamma = 5/3$) decreases from 60 K to 50 K. The work done by the gas in the process is:

(Take the universal gas constant as

 $R = 8.3 \text{ J mol}^{-1} \text{ K}^{-1}$) [RE-NEET (UG) 2026]

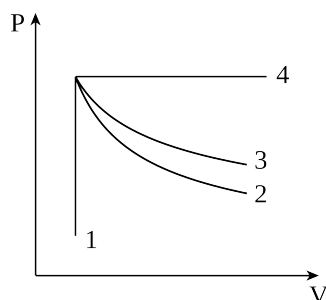
- (1) 166 J (2) 41.5 J (3) 83 J (4) 124.5 J

Scan or tap for the full solution



- Q.2** An ideal gas undergoes four different processes from the same initial state as shown in the figure below. Those processes are adiabatic, isothermal, isobaric and isochoric. The curve which represents the adiabatic process among 1, 2, 3 and 4 is

[NEET (UG) 2022]



- (1) 1 (2) 2 (3) 3 (4) 4

Scan or tap for the full solution



- Q.3** An ideal gas follows a process described by the equation $PV^2 = C$ from the initial (P_1, V_1, T_1) to final (P_2, V_2, T_2) thermodynamic states, where C is a constant. Then

[NEET (UG) 2022 (Phase 2)]

- (1) If $P_1 > P_2$ then $V_1 > V_2$
 (2) If $P_1 > P_2$ then $T_1 < T_2$
 (3) If $V_2 > V_1$ then $T_2 > T_1$
 (4) If $V_2 > V_1$ then $T_2 < T_1$

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- Q.4** Two cylinders A and B of equal capacity are connected to each other via a stop cock. A contains an ideal gas at standard temperature and pressure. B is completely evacuated. The entire system is thermally insulated. The stop cock is suddenly opened. The process is :

[NEET (UG) 2020]

- (1) adiabatic (2) isochoric
 (3) isobaric (4) isothermal

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- Q.5** In which of the following processes, heat is neither absorbed nor released by a system?

[NEET (UG) 2019]

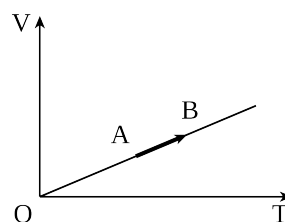
- (1) adiabatic (2) isobaric
 (3) isochoric (4) isothermal

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- Q.6** The volume (V) of a monatomic gas varies with its temperature (T), as shown in the graph. The ratio of work done by the gas, to the heat absorbed by it, when it undergoes a change from state A to state B, is

[NEET 2018]

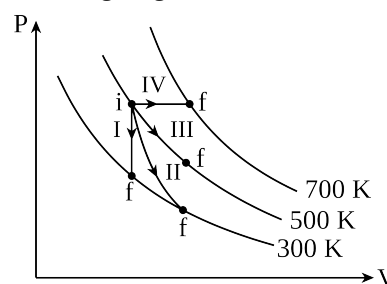


- (1) $\frac{2}{5}$ (2) $\frac{2}{3}$ (3) $\frac{1}{3}$ (4) $\frac{2}{7}$

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- Q.7** Thermodynamic processes are indicated in the following diagram.



Match the following

[NEET 2017]

Column-1		Column-2	
a.	Process I	i.	Adiabatic
b.	Process II	ii.	Isobaric
c.	Process III	iii.	Isochoric
d.	Process IV	iv.	Isothermal

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

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

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

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

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Q.8 A gas is compressed isothermally to half its initial volume. The same gas is compressed separately through an adiabatic process until its volume is again reduced to half. Then [NEET 2016 (Phase 1)]

(1) Compressing the gas isothermally or adiabatically will require the same amount of work.

(2) Which of the case (whether compression through isothermal or through adiabatic process) requires more work will depend upon the atomicity of the gas.

(3) Compressing the gas isothermally will require more work to be done.

(4) Compressing the gas through adiabatic process will require more work to be done.

Scan or tap for the full solution



Q.9 One mole of an ideal monatomic gas undergoes a process described by the equation $PV^3 = \text{constant}$. The heat capacity of the gas during this process is [NEET 2016 (Phase 2)]

(1) $\frac{3}{2}R$ (2) $\frac{5}{2}R$ (3) $2R$ (4) R

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Q.10 An ideal gas is compressed to half its initial volume by means of several processes. Which of the process results in the maximum work done on the gas ? [AIPMT 2015]

(1) Isochoric (2) Isothermal
(3) Adiabatic (4) Isobaric

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Q.11 A monatomic gas at a pressure P , having a volume V expands isothermally to a volume $2V$ and then adiabatically to a volume $16V$. The final pressure of the gas is (Take $\gamma = 5/3$) [AIPMT 2014]

(1) $64P$ (2) $32P$ (3) $P/64$ (4) $16P$

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Q.12 During an adiabatic process, the pressure of a gas is found to be proportional to the cube of its temperature. The ratio of $\frac{C_p}{C_v}$ for the gas is [NEET 2013]

(1) $\frac{5}{3}$ (2) $\frac{3}{2}$ (3) $\frac{4}{3}$ (4) 2

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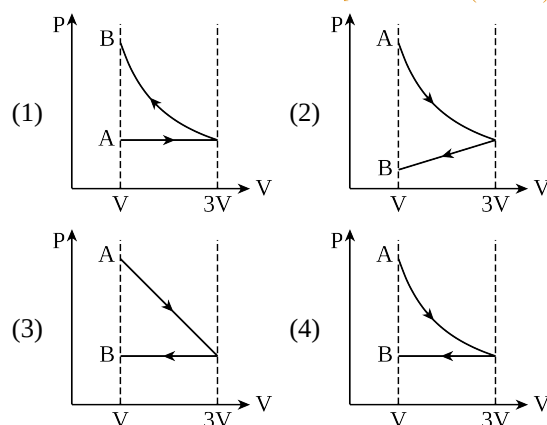
Q.13 Which of the following relations does not give the equation of an adiabatic process, where terms have their usual meaning? [NEET 2013 (Karnataka)]

(1) $P^{1-\gamma} T^\gamma = \text{constant}$ (2) $PV^\gamma = \text{constant}$
(3) $TV^{\gamma-1} = \text{constant}$ (4) $P^\gamma T^{1-\gamma} = \text{constant}$

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Q.14 One mole of an ideal gas goes from an initial state A to final state B via two processes : It first undergoes isothermal expansion from volume V to $3V$ and then its volume is reduced from $3V$ to V at constant pressure. The correct P-V diagram representing the two processes is [AIPMT 2012 (Prelims)]



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Q.15 A mass of diatomic gas ($\gamma = 1.4$) at a pressure of 2 atmospheres is compressed adiabatically so that its temperature rises from 27°C to 927°C . The pressure of the gas in the final state is [AIPMT 2011 (Mains)]
(1) 8 atm (2) 28 atm (3) 68.7 atm (4) 256 atm

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Q.16 A monatomic gas at pressure P_1 and volume V_1 is compressed adiabatically to $\frac{1}{8}$ of its original volume. What is the final pressure of the gas? [AIPMT 2010 (Mains)]

(1) $64P_1$ (2) P_1 (3) $16P_1$ (4) $32P_1$

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Q.17 In thermodynamic processes which of the following statements is not true ? [AIPMT 2009]

- (1) In an isochoric process pressure remains constant.
- (2) In an isothermal process the temperature remains constant.
- (3) In an adiabatic process $PV^\gamma = \text{constant}$.
- (4) In an adiabatic process the system is insulated from the surroundings.

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Q.18 One mole of an ideal gas at an initial temperature of T K does $6R$ joule of work adiabatically. If the ratio of specific heats of this gas at constant pressure and at constant volume is $5/3$, the final temperature of gas will be [AIPMT 2004]

- (1) $(T + 2.4)$ K
- (2) $(T - 2.4)$ K
- (3) $(T + 4)$ K
- (4) $(T - 4)$ K

Scan or tap for the full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	4	2	4	1	1	1	1	4	4	3	3
Ques.	12	13	14	15	16	17	18				
Ans.	2	4	4	4	4	1	4				