PHYSICS

BOOKS - MTG-WBJEE PHYSICS (HINGLISH)

THERMODYNAMICS

Wb Jee Workout Category 1 Single Option Correct Type 1 Mark

1. When the room temperature becomes equal to the dew point , the relative humidity of the room is

A. 100 %

B. zero %

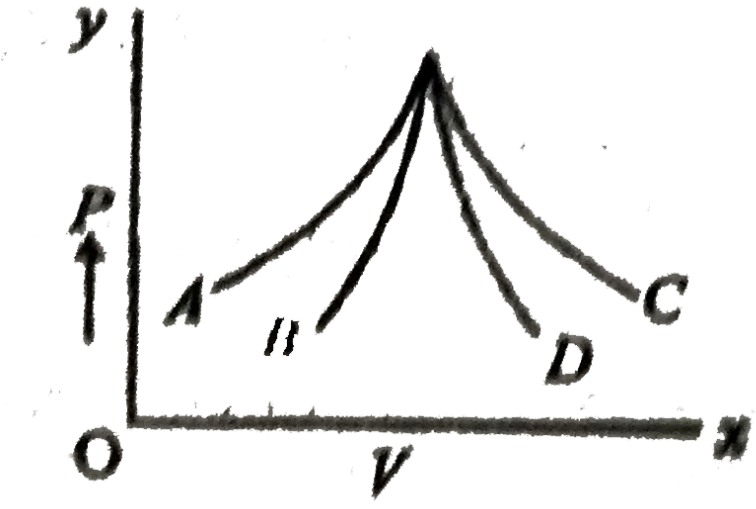
C. 70 %

D. 85 %

Answer: a

View Text Solution

2. Figure shows four PV diagrams. Which of these curves represent isothermal and adiabatic processes?



A. C and D

B. A and C

C. A and B

D. B and D.

Answer: a

Watch Video Solution

3. A perfect gas goes from state A to another state B by absorbing 8 x 10^5 J of heat and doing 6.5 x 10^5 J of external work. It is now transferred between the same two states in another process in which it absorbs 10^5 J of heat. Then in the second process,

A. work done on gas is 10^5 J

B. work done on gas is 0.5×10^5 J

C. work done by gas is 10^5J

D. work done by gas is 0.5×10^5J

Answer: b

Watch Video Solution

4. Five moles of hydrogen $(\gamma = 7/5)$, initially at STP, is compressed adiabatically so that its temperature becomes $400^\circ C$. The increase in the internal energy of the gas in kilojules is $(R = 8.30 J/mol - K)$

A. 21.55

B. 41.50

C. 65.55

D. 80.55

Answer: b

Watch Video Solution

5. A gas under constant pressure of $4.5 \times 10^5 Pa$ when subjected to $800kJ$ of heat, changes the volume from $0.5m^3 \rightarrow 2.0m^3$. The change in internal energy of the gas is

A. $6.75 \times 10^5 J$

B. 5.25×10^5 J

C. $3.25 \times 10^5 J$

D. $1.25 \times 10^5 J$.

Answer: d

Watch Video Solution

6. One mole of an ideal gas requires 207 J heat to raise its temperature by 10 K when heated at constant pressure. If the same gas is heated at constant volume to raise the temperature by the same 10 K, the heat required will be (R, the gas constant = $8.3 JK^{-1} mol^{-1}$):

A. 198.7 J

B. $29 J$

C. $215.3J$

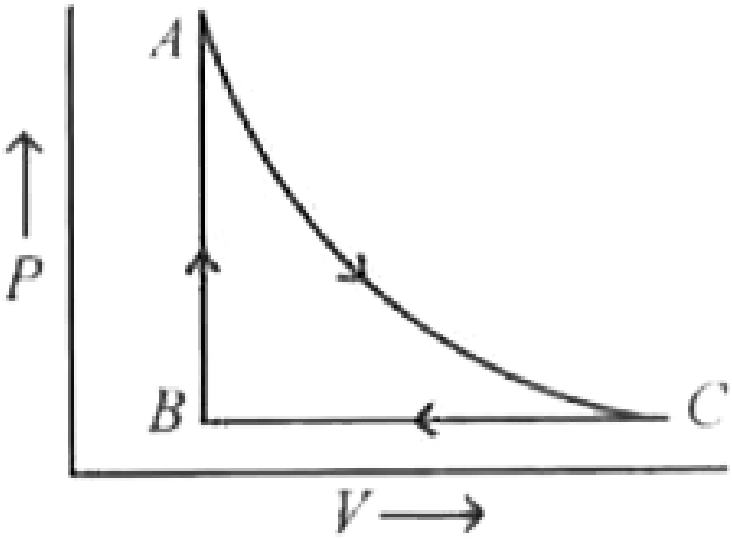
D. $124J$

Answer: d

Watch Video Solution

7. One mole of ideal gas undergoes a cyclic process ACBA as shown in figure. Process AC is adiabatic. The temperatures at 1, B and C are 300 K,600 K and 450 K

respectively. Choose the correct statement.



A. In process CA, change in internal energy is 225 R.

B. In process AB, change in internal energy is -150 R

C. In process BC, change in intenal energy is -225 R.

D. Change in internal energy during the whole cyclic process is $+150$ R.

Answer: a

View Text Solution

8. An ideal gas expands isothermally from volume V_1 to V_2 and is then compressed to original volume V_1 adiabatically. Initialy pressure is P_1 and final pressure is P_3. The total work done is W. Then

A. $P_3 > O_1, W > 0$

B. $P_3 < P_1, W < 0$

C. $P_3 > P_1, W < 0$

D. $P_3 = P_1, W = 0$

Answer: c

Watch Video Solution

9. In an adiabatic change, the pressure and temperature of a monoatomic gas are related as $p \times T^C$, where C equals

A. $3/5$

B. $5/3$

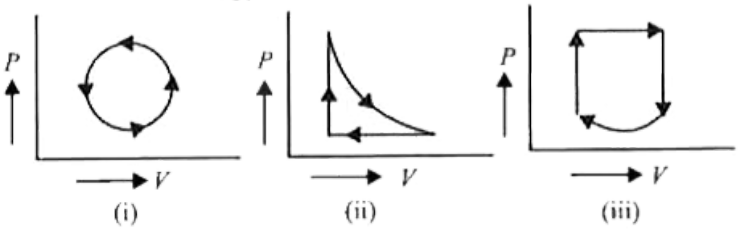
C. $2/5$

D. $5/2$

Answer: d

Watch Video Solution

10. What is the nature of change in internal energy in the following three thermodynamical processes as shown in the given figure.



A. Δ U is positive in all the three cases

B. ΔU is negative in all the three cases

C. ΔU is positive for (i) and negative for (ii) and zero for (iii)

D. $\Delta U - 0$, in all the cases.

Answer: d

View Text Solution

11. One mole of an ideal gas at temperature T_1 expands according to the law (P/V) = constant. Find the work done when the final temperature becomes T_2.

A. $R(T_2 - T_1)$

B. $(R/2)(T_2 - T_1)$

C. $(R/4)(T_2 - T_1)$

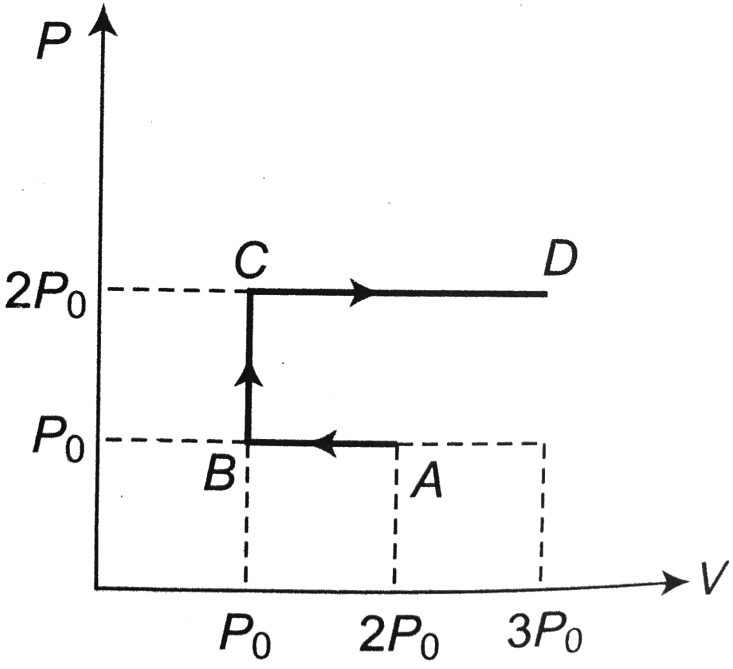
D. $PV(T_2 - T_1)$

Answer: b

View Text Solution

12. $P - V$ diagram of an ideal gas is as shown in figure.

Work done by the gas in process $ABCD$ is



A. $4P_0V_0$

B. $2P_0V_0$

C. $3P_0V_0$

D. P_0V_0

Answer: c

Watch Video Solution

13. In an isobaric process, $\Delta Q = \frac{K\gamma}{\gamma - 1}$ where $\gamma = C_P / C_V$. What is K?

A. Pressure

B. Volume

C. ΔU

D. ΔW

Answer: d

Watch Video Solution

14. Two different ideal diatomic gases A and B are initially in the same state. A and B are then expanded to same final volume through adiabatic and isothermal process respectively. If P_A, P_B and T_A, T_B represents the final pressure and temperature of A and B respectively then.

A. $P_A < P_B$ and $T_A < T_B$

B. $P_A > P_B$ and $T_A > T_B$

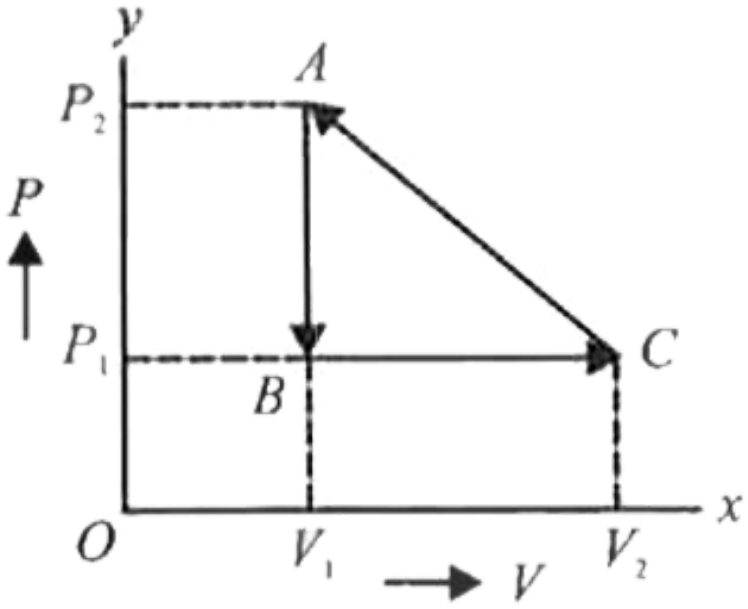
C. $P_A > P_B$ and $T_A < T_B$

D. $P_A < P_B$ and $T_A > T_B$

Answer: a

Watch Video Solution

15. Work done by the system in closed path ABCA is



A. zero

B. $(V_1 - V_2)(P_1 - P_2)$

C. $\frac{(P_2 - P_1)(V_2 - V_1)}{2}$

D. $\frac{(P_2 + P_1)(V_2 - V_1)}{2}$

Answer: c

View Text Solution

16. A monoatomic ideal gas, initially at temperature T_1, is enclosed in a cylinder fitted with a friction less piston. The gas is allowed to expand adiabatically to a temperature T_2 by releasing the piston suddenly. If L_1 and L_2 are the length of the gas column before expansion respectively, then $\frac{T_1}{T_2}$ is given by

A. $\left(\frac{L_1}{L_2}\right)^{2/3}$

B. $\frac{L_1}{L_2}$

C. $\frac{L_2}{L_1}$

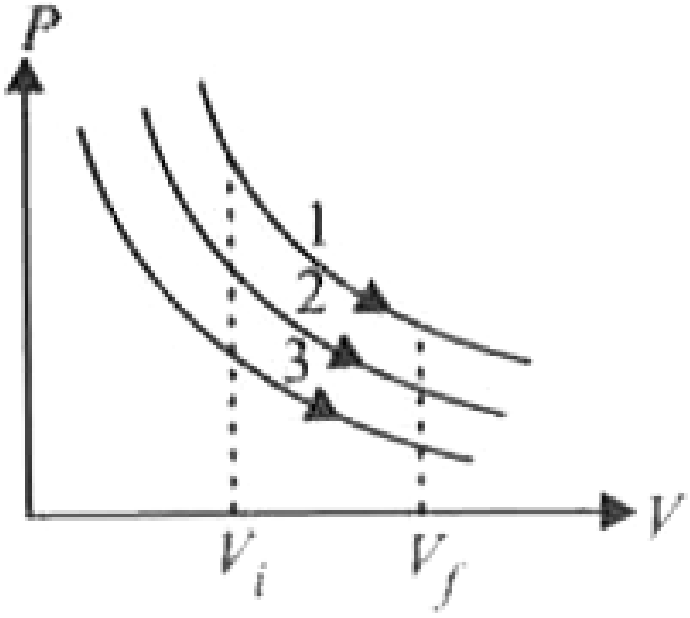
D. $\left(\frac{L_2}{L_1}\right)^{2/3}$

Answer: d

Watch Video Solution

17. In figure, three isothermal processes are shown for the same gas and for same change in volume $\left(V_i - V_f\right)$ but at different temperature. If $\Delta Q_1, \Delta Q_2,$ and ΔQ_3 are

the heat transferred in the respective process, then



A. $\Delta Q_1 = \Delta Q_2 = \Delta Q_3$

B. $\Delta Q_1 > \Delta Q_2 > \Delta Q_3$

C. $\Delta Q_1 < \Delta Q_2 < \Delta Q_3$

D. $\Delta Q_1 = \Delta Q_2 = \Delta Q_3 = 0$

Answer: b

View Text Solution

18. An ideal gas is made to go through a cyclic thermodynamical process in four steps. The amount of heat involved are $Q_1 = 600J, Q_2 = -400J, Q_3 = -300J$ and $Q_4 = 200J$ respectively. The corresponding work involved are $W_1 = 300J, W_2 = -200J, W_3 = -150J$ and W_4. The value of W_4 is

A. $-50J$

B. $100J$

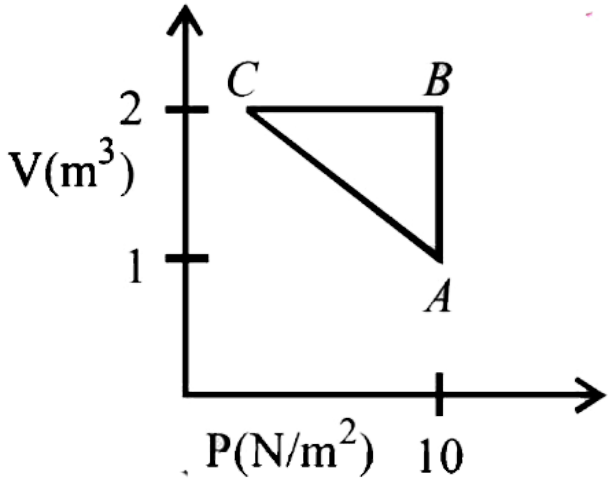
C. $150J$

D. $50J$

Answer: c

View Text Solution

19. An ideal gas is taken through the cycle $A \to B \to C \to A$, as shown in the figure, If the net heat supplied to the gas in the cycle is 5J, the work done by the gas in the process CtoA is



A. $-5J$

B. $-10J$

C. $-15J$

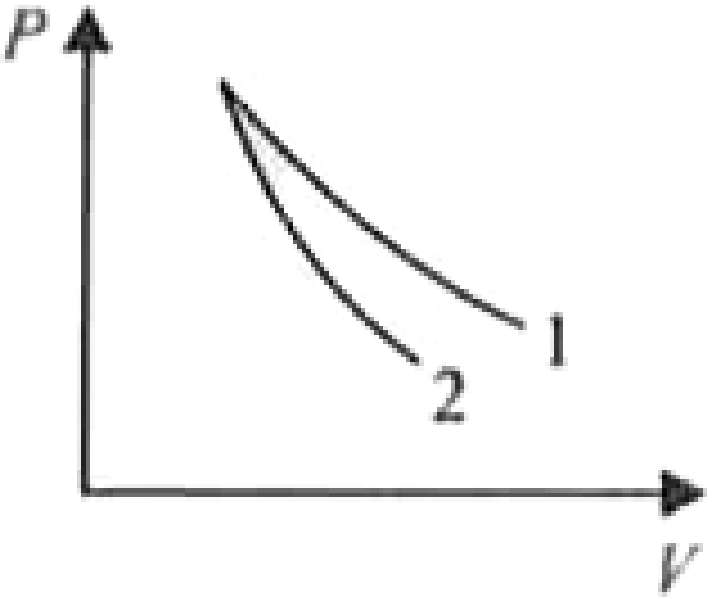
D. $-20J$

Answer: a

Watch Video Solution

20. $P-V$ plots for two gases during P4 adiabatic process are shown in the figure. Plots 1 and 2 should

correspond respectively to



A. He and O_2

B. O_2 and He

C. He and Ar

D. O_2 and N_2.

Answer: b

View Text Solution

21. In a given process on an ideal gas, $dW = 0$ and $dQ < 0$. Then for the gas

A. the temperature will decrease

B. the volume will increase

C. the pressure will remain constant

D. the temperature will increase.

Answer: a

View Text Solution

22. A thermally insulated container is divided into two parts by a screen. In one part the pressure and temperature are P and T for an ideal gas filled. In the second part it is vacuum. If now a small hole is created in the screen, then the temperature of the gas will

A. decrease

B. increase

C. remain same

D. none of these.

Answer: c

View Text Solution

23. During the adiabatic expansion of 2 moles of a gas, the internal energy of the gas is found to decrease by 2 joules , the work done during the process on the gas will be equal to

A. $-2J$

B. $2J$

C. $-1J$

D. $1J$

Answer: a

Watch Video Solution

24. A Carnot engine takes 3×10^6 cal of heat from a reservoir at $627^\circ C$ and gives it to a sink at $27^\circ C$. The work done by the engine is:

A. $4.2 \times 10^6 J$

B. $8.4 \times 10^6 J$

C. $16.8 \times 10^6 J$

D. zero.

Answer: b

Watch Video Solution

25. A reversible engine takes heat from a reservoir at $527^{\circ}C$ and gives out to the sink at $127^{\circ}C$. The engine is required to perform useful mechanical work at the rate of 750 watt. The efficiency of the engine is

A. $50\ \%$

B. $75\ \%$

C. $100\ \%$

D. $25\ \%$

Answer: a

Watch Video Solution

26. Two moles of ideal helium gas are in a rubber balloon at $30^{\circ}C$. The balloon is fully expandable and can be assumed to require no energy in its expansion. The temperature of the gas in the balloon is slowly changed to $35^{\circ}C$. The amount of heat required in raising the temperature is nearly (take R $= 8.31J/mol.\ K$)

A. $62J$

B. $104J$

C. $124J$

D. $208J$

Answer: d

Watch Video Solution

27. An ideal gas heat engine operates in Carnot cycle between $227^\circ C$ and $127^\circ C$. It absorbs $6x10^4 cals$ of heat at higher temperature. Amount of heat converted to work is

A. $2000J$

B. $4000J$

C. $8000J$

D. $5600J$

Answer: a

Watch Video Solution

28. A vessel contains 1 mole of O_2 gas (relative molar mass 32) at a temperature T. The pressure of the gas is P. An identical vessel containing one mole of He gas (relative molar mass 4) at temperature 2T has a pressure of

A. $P/8$

B. P

C. $2P$

D. $8P$

Answer: c

Watch Video Solution

29. Two cylinders A and B fitted with pistons contain equal amounts of an ideal diatomic gas at 300K. The piston of A is free to move, while that B is held fixed. The same amount of heat is given to the gas in each cylinder. If the rise in temperature of the gas in A is 30K, then the rise in temperature of the gas in B is

A. $30K$

B. $18K$

C. $50K$

D. $42K$

Answer: d

Watch Video Solution

30. Two identical containers A and B with frictionless pistons contain the same ideal gas at the same temperature and the same velocity V. The mass of the gas in A is m_A, and that in B is m_B. The gas in each cylinder is now allowed to expand isothermally to the same final volume 2V. The changes in the pressure in A and B are found to be ΔP and $1.5\Delta P$ respectively. Then

A. $4m_A = 9m_B$

B. $2m_A = 3m_B$

C. $3m_A = 2m_B$

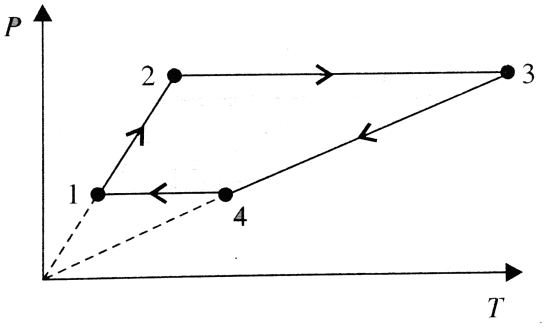
D. $9m_A = 4m_B$

Answer: c

Watch Video Solution

Wb Jee Workout Category 2 Single Option Correct Type 2 Mark

1. Three moles of an ideal monoatomic gas perform a cycle shown in figure. The gas temperatures in different states are $T_1 = 400K, T_2 = 800K, T_3 = 2400K,$ and $T_4 = 1200K$. The work done by the gas during the cycle is :



A. $5kJ$

B. $10kJ$

C. $15kJ$

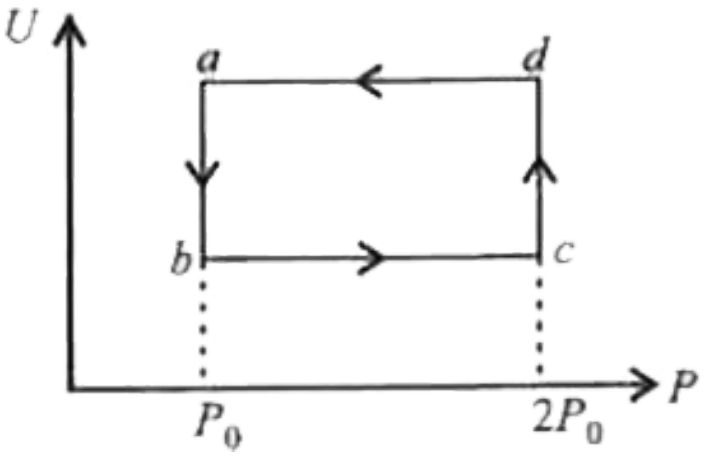
D. $20kJ$

Answer: d

Watch Video Solution

2. Figure shows the variation of internal energy (U) with the pressure (P) of 2.0mole gas in cyclic process abeda. The temperature of gas at c and d are 300 and 500 K. How much will be the heat absorbed by the gas during

the process?



A. $400R \ \ln \ 2$

B. $100 \ \text{Rin} \ 2$

C. $100 \ \text{Rin2}$

D. $50 \ \text{Rin} \ 2$

Answer: a

View Text Solution

3. A diatomic ideal gas is heated at constant at constant volume until the pressure is doubled and again heated of constant pressure until the volume is doubled. The average molar heat capacity for the whole process is

A. $\frac{13R}{6}$

B. $\frac{19R}{6}$

C. $\frac{23R}{6}$

D. $\frac{17R}{6}$

Answer: b

Watch Video Solution

4. Oxygen gas is made to undergo a process in which its molar heat capacity C depends on its absolute temperature T as $C = \alpha T$. Work done by it when heated from an initial temperature T_0 to a final temperature $2T_0$, will be

A. $4\alpha T_0^2$

B. $(\alpha T_0 - 1)\frac{3T_0}{2}$

C. $(3\alpha T_0 - 5)R\frac{T_0}{2}$

D. none of these

Answer: c

Watch Video Solution

5. A gass of given mass at a pressure of $10^5 Nm^{-2}$ expands isothermally until its volume is doubled and then adiabatically until volume is again double. Find the final pressure of the gas. $(\gamma = 1.4)$

A. $0.76:1$

B. $1:1$

C. $0.66:1$

D. $0.86:1$

Answer: a

Watch Video Solution

6. A Carnot engine whose sink is at 300 K has an efficiency of $40\,\%$. By how much should the temperature of source be increased so as to increase its efficiency by $50\,\%$ of original efficiency?

A. $380K$

B. $275K$

C. $325K$

D. $250K$

Answer: d

View Text Solution

7. A gas expands with temperature according to the relation $V = KT^{\frac{2}{3}}$.Work done when the temperature changes by 60K is.

A. $10R$

B. $30R$

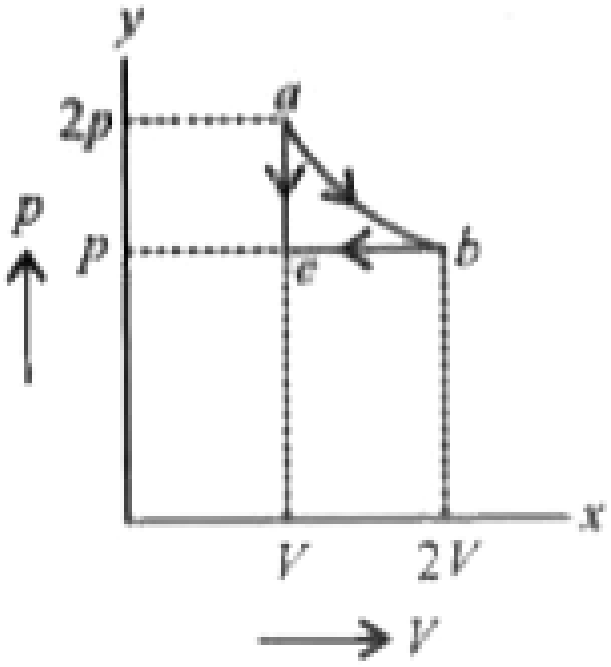
C. $40R$

D. $20R$

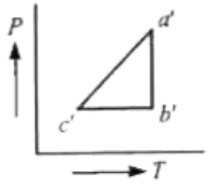
Answer: c

Watch Video Solution

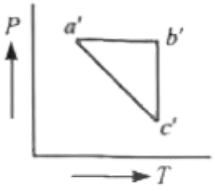
8. One mole of an ideal gas undergoes a cyclic process abca, as shown in figure. If ab is isothermal process, then which of the following is correct $P-T$diagram for the cyclic process ?



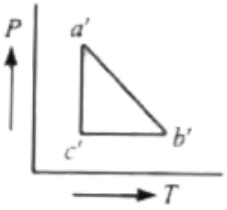
A.



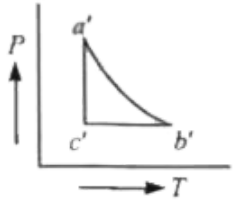
B.



C.



D.

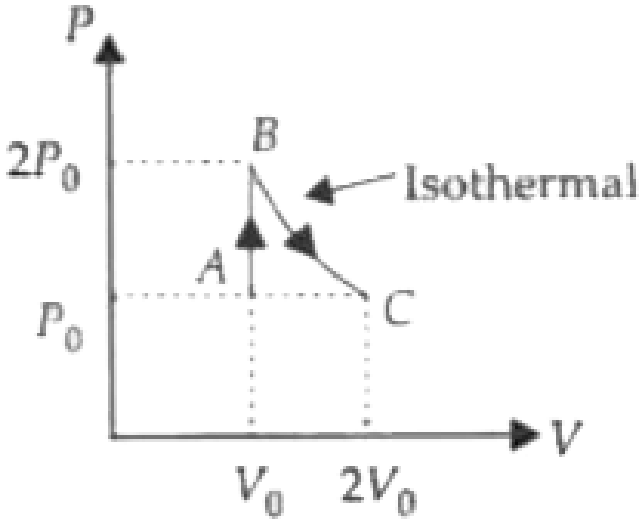


Answer: a

View Text Solution

9. A diatomic ideal gas undergoes a thermodynainic change according to the P-V diagram shown in figure, The

total heat given to the gas is nearly



A. $2.5P_0V_0$

B. $1.4P_0V_0$

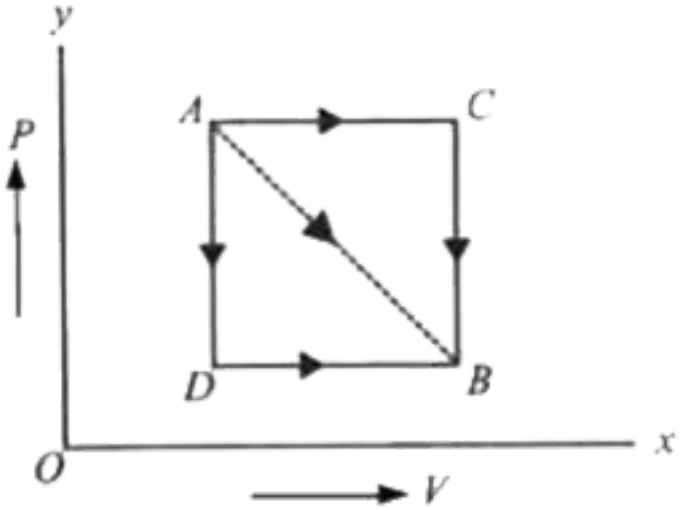
C. $3.9P_0V_0$

D. $1.1P_0V_0$

Answer: c

View Text Solution

10. An ideal gas is taken from state A to state B following three different paths as shown in P-V diagram. Which one of the following is true ?



A. work done is maximum along AB

B. work done is minimum along AB

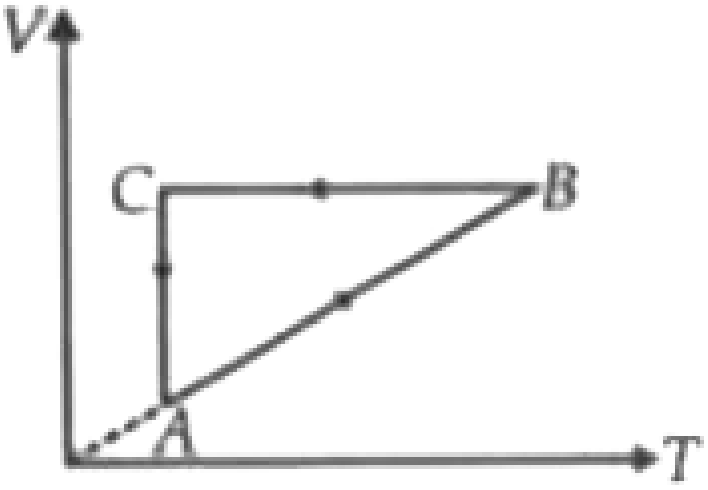
C. work done along ACB = work done along ADB

D. work done along ADB is minimum.

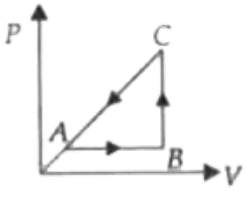
Answer: d

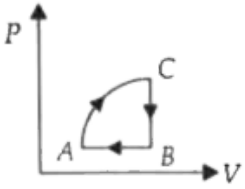
View Text Solution

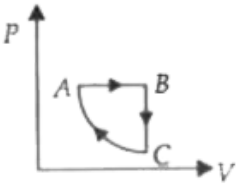
11. A cyclic process ABCA is shown in the given V-T diagram. Process in the P-V diagram will be

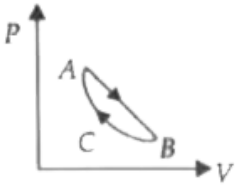


A.



B. 

C. 

D. 

Answer: c

View Text Solution

12. A petrol engine consumes 20 kg of petrol per hour. The calorific value of the fuel is 1×10^7 cal/kg. The power

of the engine is 84 kilowatt. Calculate the efficiency of the engine.

A. $36\ \%$

B. $46\ \%$

C. $28\ \%$

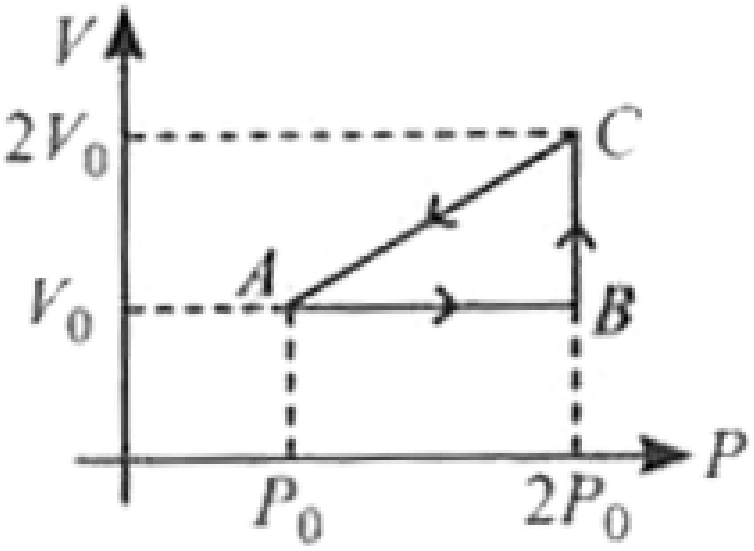
D. $58\ \%$

Answer: a

View Text Solution

13. A thermodynamic process of one mole ideal monatomic gas 2.is shown in figure. The 4 efficiency of

cyclic process ABCA will be



A. 25 %

B. 12.5 %

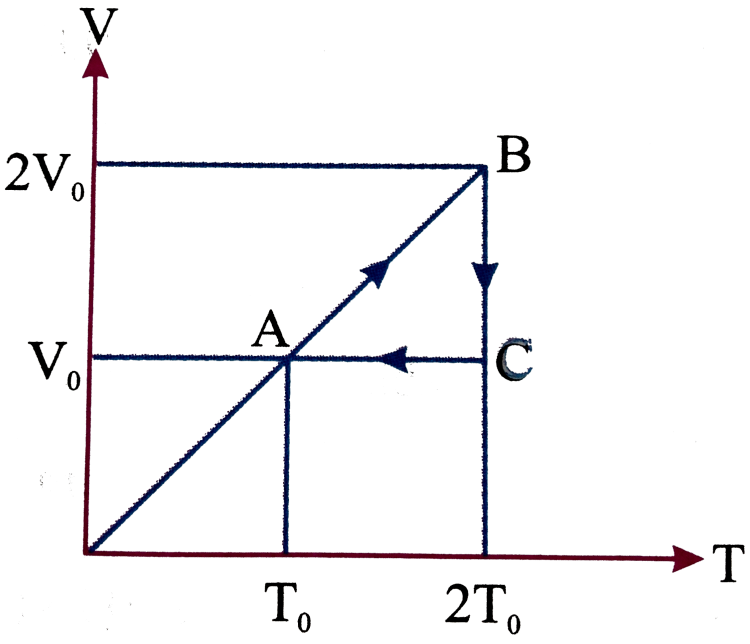
C. 50 %

D. 7.7 %

Answer: d

View Text Solution

14. An ideal monoatomic gas undergoes a cyclic process $ABCA$ as shown in the figure. The ratio of heat absorbed during AB to the work done on the gas during BC id



A. $\frac{5}{2\text{In}2}$

B. $\frac{5}{3}$

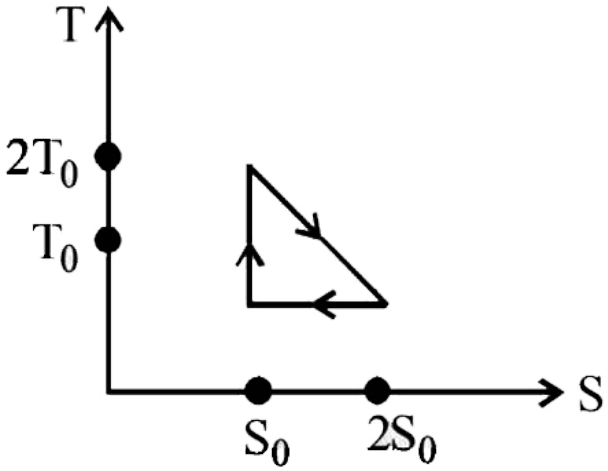
C. $\frac{5}{4\mathrm{In}2}$

D. $\frac{5}{6}$

Answer: c

Watch Video Solution

15. The temperature -entropy diagram of a reversible engine cycle is given in the figure. Its efficiency is



A. $1/2$

B. $1/4$

C. $1/3$

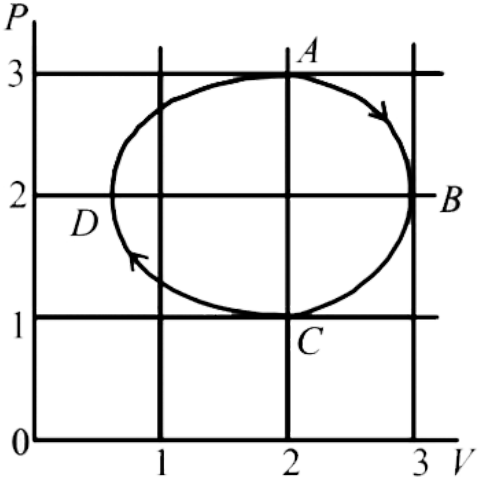
D. $2/3$

Answer: c

Watch Video Solution

Wb Jee Workout Category 3 One Or Mare Than One Option Correct Type 2 Mark

1. The figure shows the P-V plot of an ideal gas taken through a cycle ABCDA. The part ABC is a semi-circle and CDA is half of an ellipse. Then,



A. the process during the path $A \rightarrow B$is isothermal

B. heat flows out of the gas during the path $B \rightarrow C \rightarrow D$

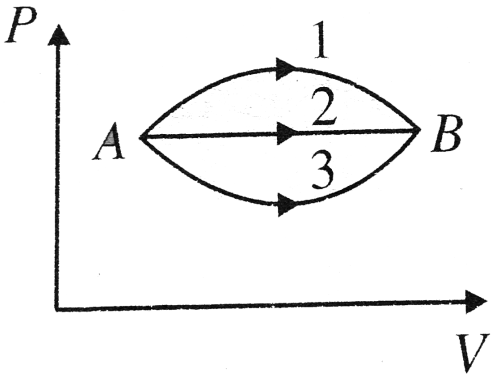
C. work done during the path $A \rightarrow B \rightarrow C$ is zero

D. positive work is done by the gas in the cycle ABCDA.

Answer: b, d

Watch Video Solution

2. A gas undergoes change in its state from position A to position B via three different path as shown in Fig. Select the correct alternatives :



A. Change in internal energy in all the three paths is equal.

B. In all the three paths heat is absorbed by the gas.

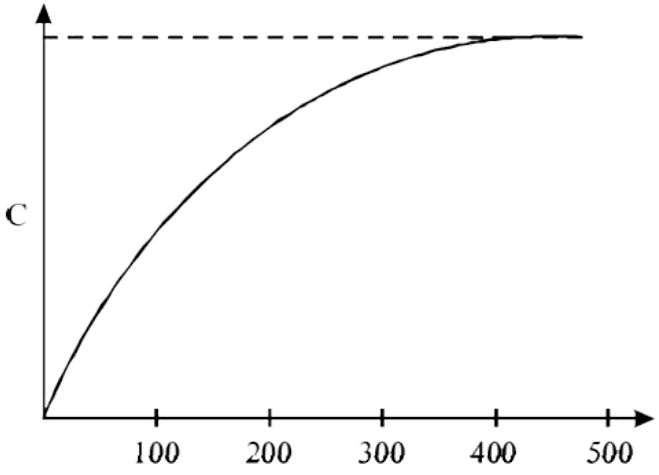
C. Heat absorbed/released by the gas is maximum in path (1).

D. Temperature of the gas first increases and then decreases continuously in path (1).

Answer: a, b, c

Watch Video Solution

3. The figure below shows the variation of specific heat capacity (C) of a solid as a function of temperature (T). The temperature is increased continuously form 0 to 500K at a constant rate. Ignoring any volume change, the following statement (s) is (are) correct to a reasonable approximation.



A. The rate at which heat is absorbed in the range $0 - 100$ K varies linearly with temperature T.

B. Heat absorbed in increasing the temperature from 0-100 K is less than the heat required for increasing the temperature from 400-500 K.

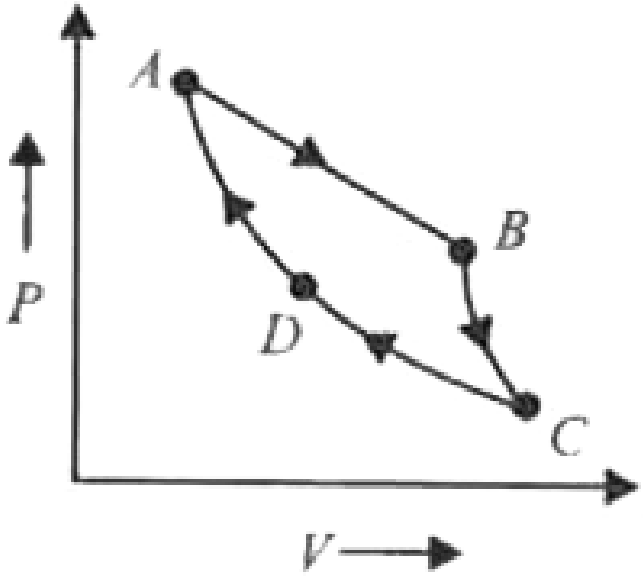
C. There is no change in the rate of heat absorption in the range 400-500 K.

D. The rate of heat absorption increases in the range 200-300 K .

Answer: b, c, d

Watch Video Solution

4. The given figure shows the $P - V$ diagram for a Camot cycle. In this diagram,



A. curve AB represents isothermal process and BC adiabatic process

B. curve AB represents adiabatic process and BC isothermal process

C. curve CD represents isothermal process and DA adiabatic process

D. curve CD represents adiabatic process and DA isothermal process.

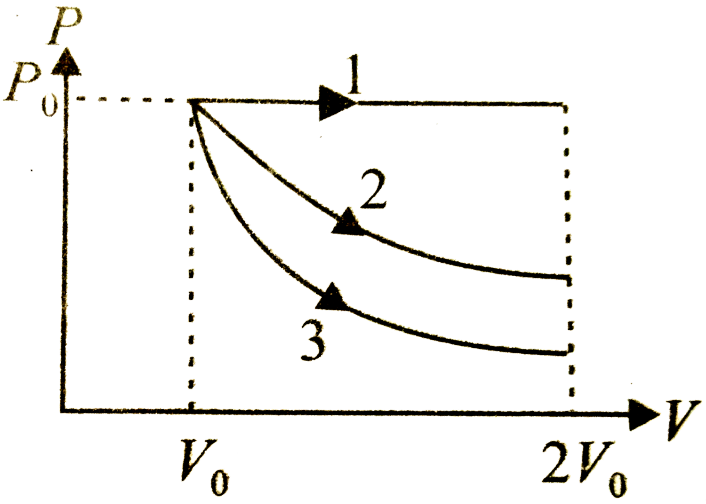
Answer: a,c

View Text Solution

5. A gas is expanded form volume $V_0 \rightarrow 2V_0$ under three different processes as shown in the figure . Process 1 is isobaric process process 2 is isothermal and and process 3 is adiabatic .

Let $\Delta U_1, \Delta U_2$ and ΔU_3 be the change in internal

energy of the gs in these three processes then



A. $\Delta U_1 > \Delta U_2 > \Delta U_3$

B. $\Delta U_1 < \Delta U_2 < \Delta U_3$

C. $\Delta U_2 < \Delta U_1 < \Delta U_3$

D. $\Delta U_2 < \Delta U_1 < \Delta U_3$

Answer: a

Watch Video Solution

6. Three processes compose a thermodynamic cycle shown in the accompanying $P-V$, diagram of an ideal gas.

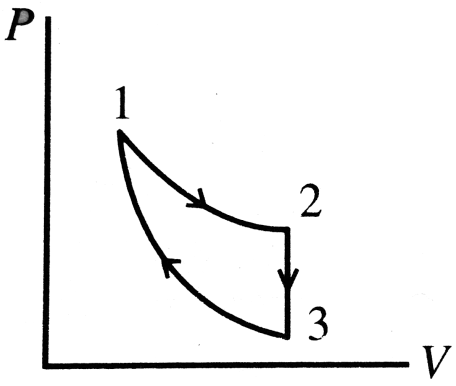
Process $1 \rightarrow 2$ take place at constant temperature, during this process $60J$ of heat enters the system.

Process $2 \rightarrow 3$ takes place at constant volume. During this process $40J$ of heat leaves the system.

Process $3 \rightarrow 1$ is adiabatic.

What is the change in internal energy of the during

process $3 \rightarrow 1$?



A. $-40J$

B. $-20J$

C. $+20J$

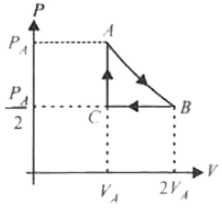
D. $+40J$

Answer: d

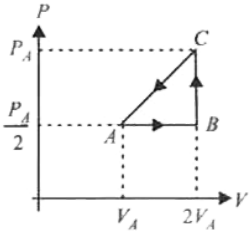
Watch Video Solution

7. Three moles of an ideal gas $C_p = 7/2\text{R}$ at pressure P_A and temperature T_A is isothermally expanded to twice its initial volume. It is then compressed at constant pressure to its original volume. Finally the gas is compressed at constant volume to the original pressure P_A.The correct P-V and P-T diagram indicating the process are

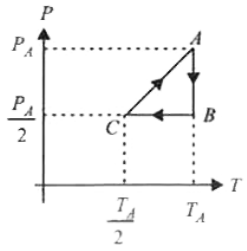
A.



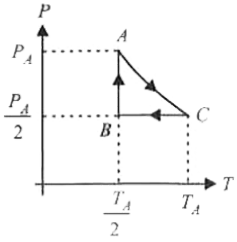
B.



C.



D.



Answer: a, c

View Text Solution

8. An ideal gas $(1$ mol, monatomic) is in the intial state P (see Fig.) on an isothermal A at temperature T_0. It is brought under a constant volume $(2V_0)$ process to Q which lies on an adiabatic B intersecting the isothermal

A at (P_0, V_0, T_0). The change in the internal energy of the gas during the process is (in terms of T_0) $\left(2^{2/3} = 1.587\right)$

A. $2.3T_0$

B. $-4.6T_0$

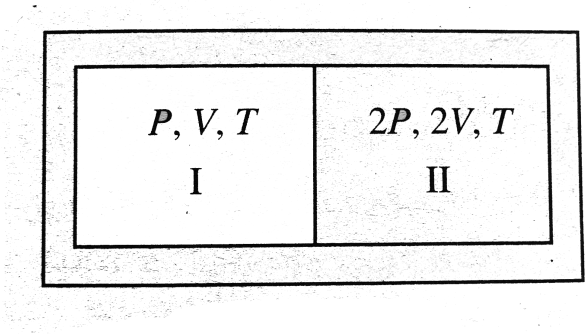
C. $-2.3T_0$

D. $4.6T_0$

Answer: b

Watch Video Solution

9. A partition divides a container having insulated walls into two compartments whose initial paraments are given. The partition is a conducting wall which can move freely without friction. Which of the following statements is/are correct, with refrence to the final equilibrium position ?



A. The pressures in the two compartments are equal.

B. Volume of compartment I is 3V/5.

C. Volume of compartment II is 12V/5.

D. Final pressure in compartment I is 5P/3.

Answer: a, b, c, d

Watch Video Solution

10. An ideal gas is taken from the state A (pressure p, volume V) to the state B (pressure $\frac{p}{2}$, volume 2V) along a straight line path in the p-V diagram. Select the correct statement(s) from the following.

A. The work done by the gas in the process A to B exceeds the work that would be done by it if the system were taken from A to B along the isotherm.

B. In the T-V diagram, the path AB becomes a part of a parabola.

C. In the P-T diagram, the path AB becomes a part of a hyperbola.

D. In going from A to B, the temperature T of the gas first increases to a maximum value and then decreases.

Answer: a, b, d

Watch Video Solution

Wb Jee Previous Years Questions

1. A frictionless piston-cylinder based enclosure contains some amount of gas at a pressure of 400 kPa. Then heat is transferred to the gas at constant pressure in a quasi-static process. The piston moves up slowly through a height of 10 cm. If the piston has a cross-sectional area of $0.3m^2$, the work done by the gas in this process is

A. $6kJ$

B. $12kJ$

C. $7.5kJ$

D. $24kJ$

Answer: b

View Text Solution

2. An ideal monoatomic gas of given mass is heated at constant pressure. In this process, the fraction of supplied heat energy used for the increase of the internal energy of the gas is

A. $\frac{3}{8}$

B. $\frac{3}{5}$

C. $\frac{3}{4}$

D. $\frac{3}{7}$

Answer: b

View Text Solution

3. The specific heat c of a solid at low temperature shows temperature dependence according to the relation $c = DT^3$where D is a constant and T is the temperature in kelvin. A piece of this solid of mass m kg is taken and its terriperature is raised from 20 K to 30 K. The amount of heat required in the process in energy units

A. $5 \times 10^4 Dm$

B. $(33/4) \times 10^4 Dm$

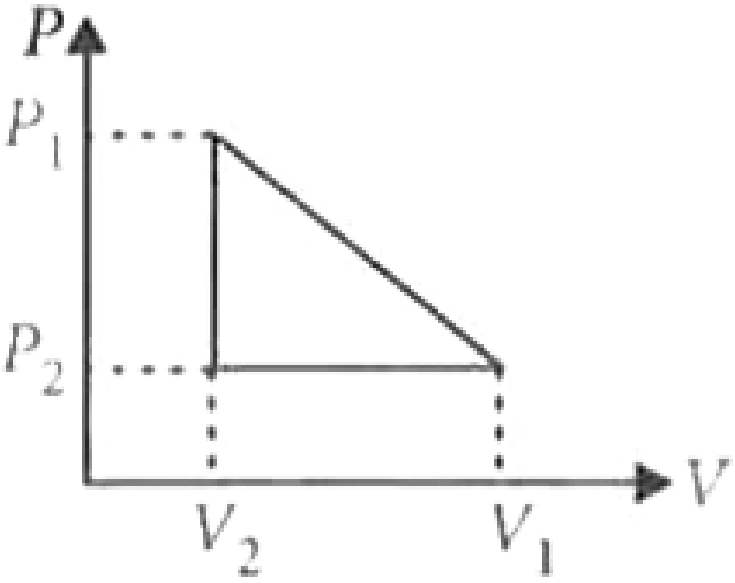
C. $(65/4) \times 10^4 Dm$

D. $(5/4) \times 10^4 Dm$

Answer: c

View Text Solution

4. One mole of a van der Waals PA gas obeying the equation P $\left(P+\frac{a}{V^2}\right)(V-b)=RT$



undergoes the quasi-static cyclic process which is shown in the P-V diagram. The net heat absorbed by the gas in this process is

A. $\frac{1}{2}(P_1-P_2)(V_1-V_2)$

B. $\frac{1}{2}(P_1 + P_2)(V_1 - V_2)$

C. $\frac{1}{2}\left(P_1 + \frac{a}{V_1^2} - P_2 - \frac{a}{V_2^2}\right)(V_1 - V_2)$

D. $\frac{1}{2}\left(P_1 + \frac{a}{V_1^2} + P_2 + \frac{a}{V_2^2}\right)(V_1 - V_2)$

Answer: a

View Text Solution

5. One mole of an ideal monoatomic gas is heated at a constant pressure of one atmosphere from0° to $100^\circ C$. Then the change in the internal energy is

A. $0.83 \times 10^3 J$

B. $4.6 \times 10^3 J$

C. $2.08 \times 10^3 J$

D. $1.25 \times 10^3 J$

Answer: d

Watch Video Solution

6. 2 moles of ideal monatomic gas is carried from a state (P_0, V_0) to a state $(2P_0, 2V_0)$ along a straight line path in a P- V diagram. The amount of heat absorbed by

A. $3P_0V_0$

B. $\frac{9}{2}P_0V_0$

C. $6P_0V_0$

D. $\frac{3}{2}P_0V_0$

Answer: c

View Text Solution

7. One mole of a mono- atomic ideal gas undergoes a quasi- static process, which is depicted by a straight line joining points (V_0T_0) and $(2V_0, 3T_0)$ in a V - T diagram . What is the value of the heat capacity of the gas at the point (V_0, T_0) ?

A. R

B. $\frac{3}{2}R$

C. $2R$

D. 0

Answer: c

View Text Solution

8. For an ideal gas with initial pressure and volume P_i and V_i, respectively, a reversible isothermal expansion happers, when its volume becomes V_0. Then it is compressed to its original volume V_i by a reversible adiabatic process. If the final pressure is P_f, then which of the following statement is true?

A. $P_f = P_i$

B. $P_f > P_i$

C. $P_f < P_i$

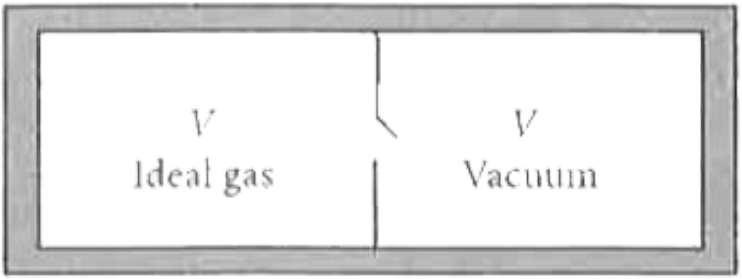
D. $\frac{P_f}{V_0} = \frac{P_i}{V_i}$

Answer: b

View Text Solution

9. Consider the given diagram. An ideal gas is contained in a chamber (left) of volume V and is at an absolute temperature T. It is allowed to rush freely into the right chamber of volume V which is initially vacuum. The whole system is thermally isolated. What will be the final temperature of the system after the equilibrium has been

attained?



A. T

B. $\frac{T}{2}$

C. $2T$

D. $\frac{T}{4}$

Answer: a

View Text Solution

10. Pressure P, volume V and temperature T for a certain gas are related by $P = \frac{AT - BT^2}{V}$, where A and B are constatns .The work done by the gas as its temperature change from T_1 to T_2 while pressure remaining constatn is

A. $A(T_2 - T_1) + B(T_2^2 - T_1^2)$

B. $\frac{A(T_2 - T_1)}{V_2 - V_1} - \frac{B(T_2^2 - T_1^2)}{V_2 - V_1}$

C. $A(T_2 - T_1) - B(T_2^2 - T_1^2)$

D. $\frac{A(T_2 - T_2^2)}{V_2 - V_1}$

Answer: c

Watch Video Solution

11. Which of the following statement(s) is/are true ? "Internal energy of an ideal gas _____ "

A. decreases in an isothermal process

B. remains constant in an isothermal process

C. increases in an isobaric process

D. decreases in an isobaric expansion

Answer: b

View Text Solution

12. The initial pressure and volume of a given mass of an ideal gas $\left(\text{with } \frac{C_p}{C_v} = \gamma\right)$, taken in a cylinder fitted

with a piston are P_0 and V_0 respectively. At this stage the gas has the same temperature as that of the surrounding medium which is T_0. It is adiabatically compressed to a volume equal to $\frac{V_0}{2}$.Subsequently the gas is allowed to come to thermal equilibrium with the surroundings. What is the heat released to the surroundings?

A. 0

B. $\left(2^{\gamma-1}-1\right)\frac{P_0V_0}{\gamma-1}$

C. $\gamma P_0V_0 \ \text{In} \ 2$

D. $\frac{P_0V_0}{2(\gamma-1)}$

Answer: b

View Text Solution