



# PHYSICS

## BOOKS - R G PUBLICATION

### THERMODYNAMICS

#### Exercise

1. State and explain zeroth law of thermodynamics .



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2. State and explain zeroth law of thermodynamics .



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3. What are the specific heat capacities of an ideal gas for an isothermal and an adiabatic process?



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4. Obtain the adiabatic equation  $PV^\gamma = \text{constant}$  from the first law of thermodynamics.



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5. Show that  $C_P - C_V = R$



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6. When 0.15 kg of ice at  $0^{\circ}C$  mixed with 0.30 kg of water at  $50^{\circ}C$  in a container, the resulting temperature is  $6.7^{\circ}C$ . Calculate the latent heat of fusion of ice. Given

$$S_{water} = 4186 Jkg^{-1}K^{-1}.$$



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7. What is reversible and irreversible processes ?



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**8.** Define isothermal and adiabatic processes.

State the second law of thermodynamics.



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**9.** obtain the expression for work done in adiabatic expansion .



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**10.** Describe heat engine. Define efficiency of heat engine. Mention two reasons for which the efficiency of a heat engine becomes low.



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**11.** State and explain zeroth law of thermodynamics .



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**12.** What is reversible and irreversible processes ?



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**13.** State the first law of thermodynamics .



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**14.** Write third law of thermodynamics.



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**15.** Write the expression of efficiency of Carnot engine.



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**16.** What is the relation between heat and work?



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**17.** Define isothermal and adiabatic processes.

State the second law of thermodynamics.



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**18.** What is entropy?



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**19.** state the second law of thermodynamics .



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**20.** What is thermodynamic equilibrium?



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**21.** State and explain first law of thermodynamic.



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**22.** what are limitations of first law of thermodynamics.



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**23.** What is Carnot engine and what is its efficiency?



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24. Calculate the amount of heat produced when 2kg substance pulled in a floor with a velocity 2m/s in 5 sec.



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25. Calculate the amount of work done on 1gm-mole gas at  $27^{\circ}C$  when volume increase twice isothermally.



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**26.** In a Carnot engine temperature of the source and sink is 500 K and 375 K. The engine can absorb 600 kcal heat in one cycle. Calculate the efficiency and work done in a cycle.



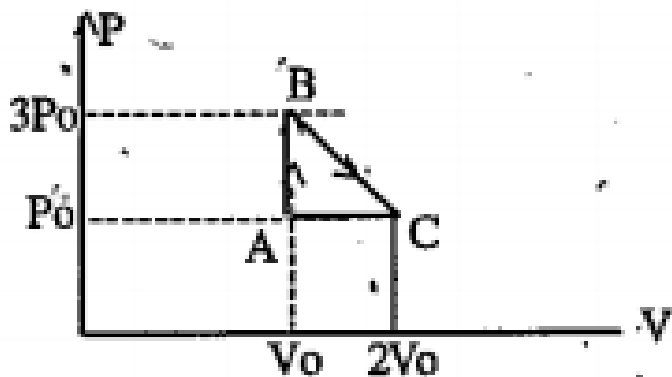
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**27.** Calculate the entropy change when 50 gm water changes the temperature from  $0^{\circ} C \rightarrow 40^{\circ} C$ .



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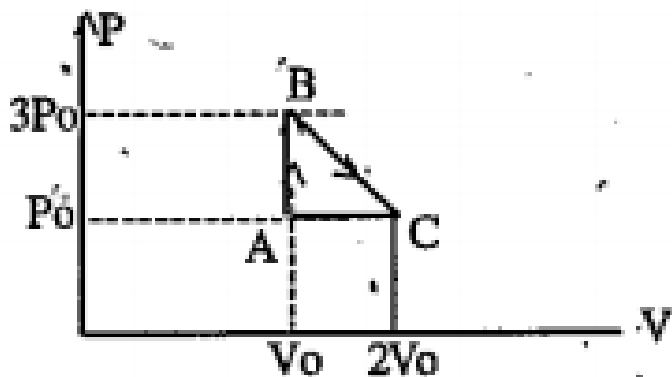
28. One mole of a gas is taken through a cycle as shown in figure calculate. Amount of work done by the gas



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29. One mole of a gas is taken through a cycle as shown in figure calculate.

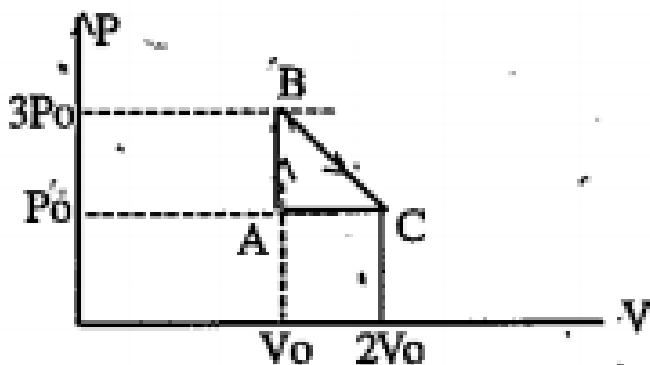
the amount of heat absorb in AB path.



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30. One mole of a gas is taken through a cycle as shown in figure calculate.

Total amount of heat absorb in BC path.



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31. An ideal gas system undergoes an isothermal process, then the work done



during the process is



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**32.** Calculate the amount of work done is an adiabatic process.



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**33.** What is Carnot engine and what is its efficiency?



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**34.** What is refrigerator. Explain the working principle on the basis of Carnot engine.



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**35.** The efficiency of a Carnot engine is  $\frac{1}{6}$  when temperature of the sink decreases by  $65K$  its efficiency becomes  $\frac{1}{3}$ . Calculate the initial and final temperature.



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**36.** Write three statements for 2nd law of thermodynamics.



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**37.** The specific heat of water is



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