PHYSICS

BOOKS - VGS BRILLIANT PHYSICS (TELUGU ENGLISH)

THERMODYNAMICS

Problems

1. If a monoatomic ideal gas of volume 1 litre at N. T.P . Is compressed

adiabatically to half of its volume , find the work done on the gas . Also find

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2. If a monoatomic ideal gas of volume 1 litre at N. T.P . Is compressed

the work done if the compression is isothermal . $(\gamma = 5/3)$

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3. Five moles of hydrogen when heated through 20 K expand by an amount of $8.3 \times 10^{-3} m^3$ under a constant pressure of $10^5 N/m^2$. If $C_v = 20 J/\text{mole} K$, Find C_p.

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Very Short Answer Questions

1. Define Thermal equilibrium . State the zeroth law of thermodynamics (or) How does it lead

to zeroth Law of Thermodynamics ?

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2. Define Calorie . What is the relation between calorie and mechanical equivalent of heat ?

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3. What thermodynamic variables can be defined by a) Zeroth Law b) First Law ?

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4. Define specific heat capacity of the substance . On what factors does it depend ?

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5. Define molar specific heat capacity .

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6. For a solid , What is the total energy of an oscillator ?

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7. Indicate the graph showing the variation of specific heat of water with temperature . What does it signify?

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8. Define state variables and equation of state .

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9. Why a heat engine with 100 % efficiency can never be realised in practise ?

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10. In summer , when the value of a bicycle tube is opened , the escaping air appears cold

. Why ?

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11. Why does the brake drum of an automobile get heated up while moving down at constant speed ?

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12. Can a room be cooled by leaving the door of an electric refrigerator open ?

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13. Which of the two will increase the presure more , an adiabatic or an isothermal process , in reducing the volume to 50 % ?

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14. A thermos flask containing a liquid is shaken vigorously . What happens to its temperature?

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15. A sound wave is sent into a gas pipe . Does its internal energy change ?

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16. How much will be the internal energy change in

isothermal process

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17. How much will be the internal energy change in

adiabatic process

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18. The coolant in a chemical or a unclear plant should have high specific heat . Why ?

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19. Explain the following processes

Isochoric process

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20. Explain the following processes

Isobaric process

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Short Answer Questions

1. State the first law of thermodynamics.

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2. Define two principal specific heats of a gas . Which is greater and why ?

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3. Derive a relation beween the two specific heat capacities of gas on the basis of first law

of thermodynamics .

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4. Obtain expression for the work done by an indeal gas during isothermal change .

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5. Obtain an expression for the work done by an ideal gas during adiabatic change and explain .

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6. Compare isothermal and an adiabatic process .

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7. Explaon the following processes

Cyclic process with example

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8. Explaon the following processes

Non cyclic process with example

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9. Write a short note on Quasi-static process .

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10. Explain qualitatively the working of a heat engine .

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Long Answer Questions

1. Explain reversible and irreversible processes . Describe the working of Carnot engine . Obtain an expression for the efficiency .

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2. State second law of thermodynamice . How is heat engine different from a refrigerator ?

Explain.

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3. State second law of thermodynamics . Describe the working of carnot engine . Obtain an expression for the efficiency .

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4. What is the differnce between heat engine and refigerator .

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