SHIKSHA CLASSES

BOARD QUESTION PAPER

Subject : Physics **Topic: 4. Thermodynamics** **Total Marks : 20**

Class : XII **Time : 1 Hr.**

Section A

Q.1 : Select and write the most appropriate answer from given alternatives in each sub-question. **5M**

i) During an adiabatic process, the pressure of a gas is found to be proportional to the cube of its absolute temperature. The ratio of C_p/C_v of the gas is.

a) 3/2 b) 2 c) 4/3 d) All of above

ii) If 300 ml of a gas at 27^0 C is cooled to 7^0 C at constant pressure, then its volume will be.

a) 540ml b) 280 ml c) 350 ml d) 135 ml

iii) The internal energy of ideal gas depends upon.

a) Specific volume b) Temperature c) Pressure d) Density

iv) The state of thermodynamic system is represented by

a) Pressure only b) Pressure, volume, temperature

c) Volume only d) Number of moles

v) Which of the following process is used to do maximum work done on the ideal gas if the gas is compressed to half of its initial volume?

a) Isothermal b) Isochoric c) Isobaric d) Adiabatic

Q.2 : Very short answers type questions. **2M**

i) Define reversible and irreversible process.

ii) State and explain zeroth law of thermodynamics.

Section B

Attempt any THREE. **6M**

Q.3 : Distinguish between isothermal process & adiabatic process.

Q.4 : What will be rise temperature if ideal gas at 27^0 C is compressed adiabatically to 8/27 of its original volume? $(\gamma = 5/3)$

Q.5 : A system is given 300 calories of heat and it does 600 joules of work. How much does internal energy change in this process (J= 4.18 Joules/cal)

Q.6 : Draw a p-v diagram and explain concept of positive and negative work. Give one example each.

Section C

Attempt any one of following. **3M**

Q.7 : State the equation of adiabatic process, give the adiabatic relation between

i) Volume and temperature and ii) Pressure and temperature.

Q.8 : 2 mole of a gas at temp 300 K expands isothermally from an initial volume of 3.0L to final volume of 6.0L.what is the work done by the gas? How much heat is supplied to the gas? ($R=8.13\ mol^{-1}\ k^{-1}$)

Section D

Attempt any one of following. **4M**

Q.9 : i) A mixture of fuel and oxygen is burned in a constant-volume chamber surrounded by a water bath. It was noticed that the temperature of water increased during the process. Treating the mixture of fuel and oxygen as the system. a) Has heat been transferred? a) Has work been done? c) What is the sign of ΔU?

ii) 104 kJ of work is done on certain volume of a gas. If the gas releases 125 kJ of heat, calculate the change in internal energy of the gas.

Q.10 : i) What is refrigerator? Explain its working and obtain an expression for its coefficient of performance.

ii) 1 mm^3 of a gas compressed at 1 atmospheric pressure and temperature 27^0 C to 627^0 C. What is the final pressure under adiabatic condition? (γ for gas = 1.5)

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