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ASSIGNMENT - 1
PROPERTIES OF GAS

Q-1

One kg of ideal gas is heated from 18°C to 98°C. Assuming R = 0.264 kJ/kg·K and gamma = 1.2 for the gas and Work done 200 kJ, find:

(1) Specific heats

(2) The change in internal energy

(3) The change in enthalpy

(4) The heat supplied

Q-2

The characteristic constant for a gas is 0.29 kJ/kg·K. 0.9 kg of this gas receives heat at constant pressure of 8 bar. The increase in temperature is from 25°C to 300°C as a result of heat supplied. If C = 0.72 kJ/kg·K, calculate:

(1) Increase in internal energy

(2) Increase in work done (External energy)

(3) Increase in total energy

(4) Specific heat at constant pressure

Q-3

One kg of an ideal gas is heated from 18°C to 98°C. Assuming R = 0.27 kJ/kg·K and gamma = 1.18 for the gas, calculate:

(1) Specific heats

(2) Change in internal energy

(3) Change in enthalpy

Q-4

A cylinder contains 0.6 m^3 of a gas at a pressure of 1 bar, and 90°C. The gas is compressed to a volume of 0.18 m^3 according to law PVC. The final pressure is 5 bar. Calculate:

(1) The mass of gas

(2) The value of index 'n' for compression

(3) The increase in internal energy of the gas

(4) The heat received or rejected by the gas during compression. Take gamma = 1.4 and R = 294.2 J/kg·K.

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Q-5

0.3 kg of air at a pressure of 1.5 bar occupies 0.2 m^3 and is compressed to 15 bar according to the law $PV^{1.25} = C$. Calculate:

(1) The change in internal energy of the air (2) The work done on or by the air

(3) The heat received or rejected by the air

Take $C_p = 1.005$ kJ/kg·K and $C_v = 0.718$ kJ/kg·K.

Q-6

2 kg of air at a pressure of 7 bar occupies a volume of 0.3 m^3. This air is then expanded to a volume of 1.5 m^3 isothermally. Assuming $C_p = 0.9965$ kJ/kg·K, $C_v = 0.708$ kJ/kg·K and $R = 287.2$ J/kg·K, calculate:

(1) The final temperature

(2) The work done

(3) Heat abstracted or rejected in the process.