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JEE MAIN THERMODYNAMICS (PHYSICS) — FIRST LAW OF THERMODYNAMICS — PYQS

Max. Marks: 16 **Questions:** 4

Section A (MCQ) — 4 questions

Q.1 One mole of diatomic gas having rotational modes only is kept in a cylinder with a piston system. The cross-section area of the cylinder is 4 cm^2. The gas is heated slowly to raise the temperature by 1.2 °C during which the piston moves by 25 mm. The amount of heat supplied to the gas is _____ J.
(Atmospheric pressure = 100 kPa, R = 8.3 J/mol. K)
(Neglect mass of the piston)

[JEE Main 2026 (Online) 8th April Evening Shift]

(1) 24.8 (2) 10.96 (3) 15.04 (4) 29.98

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Q.2 Densities of water at 4°C and 20°C are 1000 kg/m^3 and 998 kg/m^3 respectively. The increase in internal energy of 4 kg of water when it is heated from 4°C to 20°C is _____ J.
(specific heat capacity of water = 4.2 kJ/kg K and 1 atmospheric pressure = 10^5 Pa)

[JEE Main 2026 (Online) 24th January Morning Shift]

(1) 268799.2 (2) 315826.2
(3) 234699.2 (4) 258700.8

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Q.3 The internal energy of a monoatomic gas is 3nRT. One mole of helium is kept in a cylinder having internal cross section area of 17 cm^2 and fitted with a light movable frictionless piston. The gas is heated slowly by supplying 126 J heat. If the temperature rises by 4°C, then the piston will move _____ cm.
(atmospheric pressure = 10^5 Pa)

[JEE Main 2026 (Online) 23rd January Evening Shift]

(1) 1.55 (2) 14.5 (3) 15.5 (4) 1.45

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Q.4 During the melting of a slab of ice at 273 K at atmospheric pressure :

[JEE Main 2025 (Online) 3rd April Morning Shift]

(1) Internal energy of ice-water system remains unchanged.
(2) Positive work is done by the ice-water system on the atmosphere.
(3) Positive work is done on the ice-water system by the atmosphere.
(4) Internal energy of the ice-water system decreases.

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ANSWER KEY

Ques.	1	2	3	4							
Ans.	2	1	3	3							