THERMODYNAMICS

Q.1. **Find the amount of work done to increase the temperature of one mole of ideal gas by 30°C, if it is expanding under the condition V is directly proportional to $T^{2/3}$**
(R = 8.31 J/mol-K)
(a) 16.62 J
(b) 166.2 J
(c) 1662 J
(d) 1.662 J

Q.2. **When an ideal diatomic gas is heated at constant pressure, the fraction of the heat energy supplied which increases the internal energy of the gas is**
(a) 2/5
(b) 3/5
(c) 3/7
(d) 5/7

Q.3. **Heat is supplied to a diatomic gas at constant pressure. The ratio of $\Delta Q:\Delta U:\Delta W$ is**
(a) 5 : 3 : 2
(b) 5 : 2 : 3
(c) 7 : 5 : 2
(d) 7 : 2 : 5

Q.4. **One mol of an ideal gas at an initial temperature of T K does 6 R joules of work adiabatically. If the ratio of specific heats of this gas at constant pressure and at constant volume is 5/3, the final temperature of gas will be**
(a) (T + 2.4) K
(b) (T – 2.4) K
(c) (T + 4) K
(d) (T – 4) K

Q.5. **An ideal monoatomic gas expands to twice its original volume such that it pressure P is inversely proportional to square of volume. Find**
(a) whether gas gains heat or losses heat
(b) whether temperature of the gas increases, decreases or remains constant.

Q.6. **The molar heat capacity in a process of a diatomic gas if it does a work of Q/4 when a heat Q is supplied to it is**

(a) 2/5 R

(b) 5/2 R

(c) 10/3 R

(d) 6/7 R

Q7. **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 for the gas is**

(a) 3/2

(b) 4/3

(c) 2

(d) 5/3

Q8. An ideal gas is made to go through a cyclic thermodynamical process in four steps. The amount of heat involved are $Q_1 = 600$ J, $Q_2 = -400$ J, $Q_3 = -300$ J and $Q_4 = 200$ J respectively. The corresponding work involved are $W_1 = 300$ J, $W_2 = -200$ J, $W_3 = -150$ J and W_4. The value of W_4 is

(a) – 50 J

(b) 100 J

(c) 150 J

(d) 50 J

Q9. If the molar heat capacity (in terms of R) of a monoatomic ideal gas undergoing the process: $PV^{1/2}$ = constant is (n/2) R. Find the value of n?

(a) 1

(b) 5

(c) 6

(d) 7

Q10. A carnot engine works as a refrigerator in between 250K and 300K. If it acquires 750 calories from heat source at low temperature, then what is the heat generated at higher temperature (in calories)?

(a) 700 cal

(b) 800 cal

(c) 900 cal

(d) 600 cal