

Name of the Student: _____

Question No. 1 Encircle the correct option.**(20)**

- i. Carnot cycle is
 - a. reversible
 - b. irreversible
 - c. both a&b
 - d. none of these
- ii. Isothermal process is carried out at constant
 - a. volume
 - b. pressure
 - c. temperature
 - d. entropy
- iii. In reversible process, the entropy of the system
 - a. decreases
 - b. increases
 - c. remains constant
 - d. initially increases
- iv. The efficiency of Carnot engine depends upon
 - a. sink temp.
 - b. source temp.
 - c. both a&b
 - d. working substance
- v. The Boltzmann constant k is equal to
 - a. RN_A
 - b. R/N_A
 - c. N_A / R
 - d. $1/RN_A$
- vi. The efficiency of petrol engine is
 - a. 25% to 30 %
 - b. 30% to 35 %
 - c. 35% to 40 %
 - d. 20% to 30%
- vii. The mass of gas is doubled at constant temperature then density of the gas becomes
 - a. double
 - b. half
 - c. one forth
 - d. unchanged
- viii. The value of γ for diatomic gases is
 - a. 1.67
 - b. 1.40
 - c. 1.29
 - d. zero
- ix. The process in which entropy of the system remains constant is called
 - a. adiabatic process
 - b. isothermal process
 - c. isochoric process
 - d. isobaric process
- x. Heat engine converts heat energy into
 - a. electrical energy
 - b. sound energy
 - c. mechanical energy
 - d. light energy
- xi. Which is not an example of adiabatic process?
 - a. rapid escape of air from burst tyre
 - b. rapid expansion of air
 - c. conversion of water into ice
 - d. cloud formation
- xii. A bicycle pump provides a good example of ----- law of thermodynamics
 - a. first
 - b. second
 - c. both a&b
 - d. zeroth
- xiii. The pressure exerted by the gas on the walls of vessel is directly proportional to
 - a. ave. translational K.E
 - b. ave. rotational K.E
 - c. P.E.
 - d. ave. vibrational K.E.
- xiv. The internal energy of the gas molecules is equal to
 - a. kinetic energy
 - b. potential energy
 - c. both a&b
 - d. none of these
- xv. The form of first law of thermodynamics for adiabatic process will be
 - a. $Q = W$
 - b. $Q = -W$
 - c. $W = -\Delta U$
 - d. $W = \Delta U$
- xvi. The S.I unit of entropy is
 - a. J K
 - b. J/K
 - c. K/J
 - d. J/mol
- xvii. In an isothermal process, first law can be written as
 - a. $Q = \Delta U + W$
 - b. $Q = \Delta U$
 - c. $Q = 0$
 - d. $Q = W$
- xviii. In a thermodynamics process, the equation $Q = \Delta U$ represents
 - a. isothermal process
 - b. adiabatic process
 - c. volume is constant
 - d. none of these
- xix. When temperature of source and sink of a heat engine become equal, the entropy change will be
 - a. Zero
 - b. maximum
 - c. minimum
 - d. negative
- xx. The efficiency of diesel engine is about
 - a. 25% to 30 %
 - b. 30% to 35 %
 - c. 35% to 40 %
 - d. 20% to 30%

Question No. 2 Write short answers of any SIX of the following questions.**2x6=12**

- i. Why is the average velocity of the molecules in a gas zero but the average of square of velocities is not zero?
- ii. Why does the pressure of a gas in a car tyre increase when it is driven through some distance?
- iii. Give an example a process in which no heat is transferred to or from the system but the temperature of the system changes. ?
- iv. Is it possible to convert internal energy into mechanical energy? Explain with an example.
- v. A thermo-flask containing milk as a system is shaken rapidly. Does the temperature of milk rise?
- vi. Does entropy of a system increase or decrease due to friction?
- vii. State Carnot's theorem.
- viii. Define triple point of water.

Q. No. 3 a. Define molar specific heat at constant pressure and constant volume. Also show that C_p is greater than C_v . **(5)****b.** A thermodynamic system undergoes a process in which its internal energy decreases by 300 J. if at the same time 120 J of work is done on the system; find the heat lost by the system. **(3)****OR****Q.No.4 a.** Describe the construction and working of petrol engine. **(5)****b.** A reversible engine works b/w two temperatures whose difference is 100 °C. If it absorbs 746 J of heat from the source and rejects 546 J to the sink, calculate the temperature of the source and the sink. **(3)**