

College of Science Department of physics	2 <sup>nd</sup> Stage Physics Heat and Thermodynamics	2023
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**Q1. A/** What is the difference between heat and temperature?

**B/** How do you measure the specific heat capacity of a substance?

**C/** What are the laws of thermodynamics, and how do they apply to everyday life?

**Q2. 1.** What device measures the specific heat capacity of a substance?

A. Thermometer

B. Calorimeter

C. Barometer

D. Manometer

2. What is the unit of specific heat capacity in the SI system?

A.  $\text{J/kg}^\circ\text{C}$

B.  $\text{J/kg}$

C.  $\text{J/g}$

D.  $\text{J/m}^3$

3. Which of the following processes is isothermal?

A. Temperature remains constant

B. Pressure remains constant

C. Volume remains constant

D. No heat exchange

**Q3. A/** How does a calorimeter work, and why is it used in thermodynamic experiments?

**B/** What is the significance of the zeroth law of thermodynamics?

**C/** How can you demonstrate the first law of thermodynamics in a laboratory setting?

**Q4/** What is entropy, and how does it relate to the second law of thermodynamics?

**Q5/** How does the third law of thermodynamics define absolute zero?

**Q6/** What are the different methods of heat transfer, and can you provide examples of each?

**Q7/** How does the efficiency of a heat engine relate to the second law of thermodynamics?

**Q8. 1.** What does the third law of thermodynamics state?

A. Absolute zero is unattainable

B. Heat flows from hot to cold

C. Energy is conserved in a system

D. All processes are reversible

2. Which method of heat transfer occurs through direct contact?

A. Radiation

B. Convection

C. Conduction

D. Evaporation

3. In a heat engine, what is the term for the energy output divided by the energy input?

A. Efficiency

B. Power

C. Work

D. Entropy

**Q9/ A/** What is thermal equilibrium, and how can it be achieved in a lab experiment?

**B/** How do phase changes (solid, liquid, gas) relate to heat and thermodynamics?

**Q10/** What is a heat pump, and how does it differ from a heat engine?

**Q11/** How can you determine the enthalpy change of a chemical reaction in the lab?

**Q12/** What is the difference between an isothermal and adiabatic process?

**Q13/** How do you measure the heat of fusion and heat of vaporization for a substance?

**Q14/** What is the Carnot cycle, and why is it important in thermodynamics?

**Q15. 1.** What happens to the internal energy of an ideal gas during an isothermal process?

A. Increases

B. Decreases

C. Remains constant

D. Depends on the pressure

**2.** What is the purpose of a heat pump?

A. Convert heat into work

B. Transfer heat from a colder area to a warmer area

C. Measure the specific heat of substances

D. Reduce the entropy of a system

**Q16/** How can you calculate the work done by a gas in a thermodynamic process?

**Q17/** What is a P-V diagram, and how is it used to analyze thermodynamic processes?

**Q18/** How does the concept of reversible and irreversible processes apply to real-world applications?

**Q19/** What are the practical applications of the second law of thermodynamics in engineering?

**Q20/** How do you determine the thermal conductivity of a material in a lab?

**Q21.**

1. How does an adiabatic process occur?

- A. With no change in temperature
- B. With no heat exchange with the surroundings
- C. With constant pressure
- D. With constant volume

2. Which of the following is not a phase change?

- A. Melting
- B. Sublimation
- C. Condensation
- D. Conduction

3. What is the relationship between heat, work, and internal energy according to the first law of thermodynamics?

A.  $\Delta U = Q - W$

B.  $\Delta U = Q + W$

C.  $\Delta U = Q - P$

D.  $\Delta U = W - Q$

4. What does a P-V diagram represent?

A. The relationship between pressure and temperature

B. The relationship between pressure and volume

C. The relationship between volume and temperature

D. The relationship between heat and work

5. What is the principle behind a calorimeter?

A. It measures electrical resistance

B. It measures pressure changes

C. It measures heat transfer

D. It measures mechanical work

**Q22/** What is the relationship between internal energy, heat, and work?

**Q23/** How do thermodynamic properties differ between ideal and real gases?

**Q24/** What is the significance of the Gibbs free energy in chemical reactions and phase transitions?

**Q25/** 1. What is Gibbs free energy?

A. The energy available to do work in a system

B. The measure of heat content in a system

C. The measure of randomness in a system

D. The amount of work done by a system

2. Which law of thermodynamics states that the entropy of the universe tends to increase?

A. Zeroth Law

B. First Law

C. Second Law

D. Third Law

3. What is the Kelvin scale used for?

A. Measuring mass

B. Measuring volume

C. Measuring temperature

D. Measuring pressure

4. In thermodynamics, what is a reversible process?

A. A process that occurs quickly

B. A process that can be reversed without leaving any trace

C. A process with constant volume

D. A process that transfers heat

**Q26/** In specific heat capacity of copper by Calender method, How the heat energy was produced, explain the method of Calender?

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**Good Luck**