## S. M.B.S.T. College Sangamner , Dist. Ahmednagar

## Department of Physics

## Question Bank

**Class: F.Y.B.Sc.       Subject: Physics I Heat and Thermodynamics        Sem- II**

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### Chapter :1 : Fundamentals of Thermodynamics

## Questions for 1 mark

1. Which thermodynamic system is called open system.
2. Which thermodynamic system is called Closed system.
3. Which thermodynamic system is called Isolated system.
4. What is thermal equilibrium?
5. State zeroth law of thermodynamics.
6. What is equation of state? Give its limitations.
7. State first law of thermodynamics.
8. Give physical significance of first law of thermodynamics.
9. What are the limitations of the first law of thermodynamics?
10. What is isochoric processes?
11. What is isobaric processes?
12. What is isothermal processes? Give its example.
13. What is adiabatic processes? Give its example.
14. What is indicator diagram? State its importance.
15. What is internal energy of a system?
16. What is meant by a reversible change? Give its example.
17. What is meant by an Irreversible change? Give its example.
18. For a reversible change, which conditions must be obeyed.
19. For an Irreversible change, which conditions must be obeyed.
20. Why internal energy is called as state function or point function.
21. Why work done is called as path function.

## Questions for $2\frac{1}{2}$ marks

1. Distinguish between reversible and irreversible processes.
2. State and explain zeroth law of thermodynamics. What is its importance?
3. Distinguish between Isothermal and adiabatic changes.
4. State and explain first law of thermodynamics.

5. What is indicator diagram? Show that work done is a path function.

## Questions for 4 marks

1. Derive an expression for work done during an isothermal process.
2. Derive an expression for work done during an adiabatic process.
3. Prove that slope of a adiabatic curve through point in PV diagram is $\gamma$ times the slope of the isothermal curve through the same point.
4. Derive the Van- Der Waals equation of state of a gas.

## Question. 3 : questions for 6 marks

1. Derive the adiabatic relations for a perfect gas.

## Chapter: 2 : Applied Thermodynamics

## Question. 1 : questions for 1 marks

1. Give some important statements of second law of thermodynamics.
2. What is entropy?
3. State the principle of increase in entropy.
4. What is meant by temperature – entropy diagram?
5. What is importance of T-S diagram?
6. What is the effect of pressure on the melting point of the solid?
7. What is the effect of pressure on the boiling point of the solid?
8. State joules law of heating.
9. What is heat and work ?
10. Write T-dS equations
11. What is Latent heat ?

## Question. 2 : questions for 2 ½ Marks

1. State and explain the principle of increase of entropy
2. Explain the concept of entropy
3. State and explain second law of thermodynamics

## Questions for 4 marks

1. Show that during a reversible processes the entropy of the system remains constant.
2. Derive an expression for the change of entropy of a ideal gas.
3. Derive an expression for entropy of an ideal gas when heated at constant pressure, constant volume and constant temperature.
4. Derive an expression for change in entropy when gas expands under isothermal condition.

5. Find efficiency of a reversible Carnot's engine with the help of T-S diagram.
6. Drive the first TdS equation.
7. Derive the second TdS equation.

## Question. 3 : questions for 6 marks

1. Derive the first Latent heat equation.
2. Obtain the second latent heat equation.

# Chapter: 3 : Heat Transfer Mechanism

## Question. 1 : questions for 1 marks

1. What is heat engine?
2. Give principle of heat engine.
3. What are types of heat engine?
4. What is meant by external combustion engine?
5. What is meant by internal combustion engine?
6. State principle of refrigeration .
7. What is meant by coefficient of performance?
8. State the principle of air conditioning.

## Question. 2 : questions for 2 ½ Marks

1. Explain principle of refrigeration?
2. Explain the coefficient of performance of the refrigerator.
3. Explain the principle of Air conditioning.
4. Explain the applications ofair conditioner.

## Question. 3 : questions for 6 marks

1. Explain Otto cycle with an indicator diagram
2. Obtain an expression for the efficiency of the Otto engine in terms of Compression ratio.
3. Explain diesel cycle with an indicator diagram
4. Obtain an expression for the efficiency of the Diesel engine in terms of Compression ratio.
5. Compare Diesel and Otto engine
6. Describe vapour – Compression refrigerator.
7. Explain Carnot's cycle with an indicator diagram
8. Obtain an expression for the efficiency of the Carnot's engine.

# Chapter: 4 : Thermometry

## Question. 1 : questions for 1 marks

1. State different types of thermometers.

2. What are the essential requisites of good thermometer?
3. State principle of mercury thermometer.
4. State principle of thermocouple thermometer.
5. State principle of platinum resistance thermometer.
6. State principle of bimetallic thermometer.
7. State principle of liquid filled thermometer.
8. State principle of gas filled thermometer.
9. What are the advantages and disadvantages of mercury thermometer?
10. What are the advantages and disadvantages of thermocouple thermometer?
11. What are the advantages and disadvantages of bimetallic thermometer?
12. What are the advantages and disadvantages of liquid filled thermometer?
13. What are the advantages and disadvantages of platinum resistance thermometer?
14. What are the advantages and disadvantages of gas filled thermometer?

## Question. 3 : questions for 6 marks

1. Explain principle, construction and working of mercury thermometer.
2. Explain principle, construction and working of thermocouple thermometer.
3. Explain principle, construction and working of bimetallic thermometer.
4. Explain principle, construction and working of liquid filled thermometer.
5. Explain principle, construction and working of platinum resistance thermometer.
6. Explain principle, construction and working of gas filled thermometer.