

MAHARASHTRA ANIMAL AND FISHERY SCIENCES UNIVERSITY, NAGPUR
SEMESTER END THEORY EXAMINATION, B.Tech. (Dairy Technology)

Semester	: II (V Dean)	Academic Year	: 2024-2025
Course No.	: DE-204	Course Title	: Thermodynamics
Credits	: 1+1=2	Total Marks	: 50
Day & Date	: Thursday; 14/08/2025	Time	: 2.00 hrs.

- Note:** 1) All questions from **Section 'A'** are compulsory.
2) Solve **Any Three** questions from **Section 'B'**.
3) Draw neat and well labeled diagram wherever necessary.

SECTION – 'A'

- Q. 1 A) Define the following. (05)
- Thermodynamics
 - Closed system
 - Isobaric Process
 - Enthalpy
 - Thermodynamic equilibrium
- B) Answer in one line. (05)
- What is entropy?
 - State Charle's Law.
 - What is an Isolated system?
 - What is calorific value of fuel?
 - Give the statement of Zeroth law of thermodynamics.
- Q. 2 A) State whether True or False. If false, rewrite the statement after making necessary corrections in the underlined word, if necessary. (05)
- For the same compression ratio, the efficiency of Diesel cycle is less than that of Otto cycle.
 - The term N.T.P. stands for Nominal Temperature and Pressure.
 - Carnot cycle consists of two reversible isothermal and two reversible adiabatic processes.
 - A closed system is a type of thermodynamic system which exchanges the energy and matter with its surrounding.
 - An adiabatic process is a thermodynamic process in which there is no exchange of heat from the system to its surrounding during expansion or compression.
- B) Choose the most appropriate answer from the options given below. (05)
- Heat cannot flow from higher temperature body to a lower temperature body without aid of external work is given by
 - 3rd law of thermodynamics
 - 2nd law of thermodynamics
 - 0th law of thermodynamics
 - 1st law of thermodynamics
 - Ideal Gas laws are applicable to
 - gases as well as vapours
 - gases alone and not to vapours
 - gases and steam
 - gases and vapours under certain conditions
 - Throttling of steam means
 - decrease in steam pressure
 - increase in steam pressure
 - isothermal process
 - pressure remains constant

- iv) General gas equation is
- | | |
|---------------|----------------------|
| a) $PV = nRT$ | b) $PV = mRT$ |
| c) $PVn = C$ | d) $C_p - C_v = R/J$ |
- v) Otto cycle is a
- | | |
|----------------------------|-------------------------------|
| a) constant pressure cycle | b) constant temperature cycle |
| c) constant volume cycle | d) constant entropy cycle |

SECTION – 'B'

- Q. 3 A) Enlist different thermodynamic processes and explain each on PV chart. (05)
B) Write short note on thermodynamic equilibrium and explain different temperature measuring devices. (05)
- Q. 4 A) Explain Carnot cycle with PV diagram and derive the relation for its efficiency. (05)
B) A 3m^3 gas is compressed from 1 bar to 5 bar pressure at constant temperature of 55°C . Determine the work done and change in enthalpy. (05)
- Q. 5 A) Explain Boyle law and Charles law. (03)
B) Explain different thermodynamics systems. (03)
C) Explain the classification of heat engines in details. (04)
- Q. 6 A) Differentiate enthalpy, heat and work energies. (03)
B) Explain performance of IC engine. (03)
C) Explain Otto cycle. (04)
- Q. 7 Explain the construction and working of 2-stroke and 4 stroke engines with neat diagram. (10)
