) 100634 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER U.G. (CBCSS–UG) DEGREE EXAMINATION, MARCH 2024

Physics/Applied Physics

PHY6B10/APH 6B10—THERMODYNAMICS

(2019 Admission onwards)

Time : Two Hours Maximum : 60 Marks

The symbols used in this question paper have their usual meanings

Section A - (Short Answer type)

Answer **all** *questions in two or three sentences, each correct answer carries a maximum of 2 marks.*

1. State and explain Zeroth law of thermodynamics.
2. What do you mean by quasi static process and mentions its features ?
3. Distinguish between first and second order phase transitions.
4. Plot the TS diagram for various reversible processes of a hydrostatic system.
5. Write down the Clausius-Clayperon equation and its applications.
6. State Second law of thermodynamics. What is the significance of Second law of thermodynamics ?
7. What is entropy ? Explain the entropy of reversible and irreversible processes.
8. What is thermal efficiency ? Write its expression.
9. What is Joule- Thomson expansion ? What is its use ?
10. Compare the slopes of adiabatic and isothermals.
11. Which are the macroscopic quantities, required to describe the materials in a cylinder of an automobile engine ?
12. Write short note on internal energy.

(Ceiling 20 marks)

Section B (Paragraph / Problem type)

Answer **all** *questions in a paragraph of about half a page to one page, each correct answer carries a maximum of 5 marks.*

13. What are virial coefficients ? Give their significance.
14. When 50 g of water is heated from 10°C to 90°C, by how much does its entropy change ?

Turn over

15. A quantity of air at 27°C is suddenly compressed to half its original volume. Find the final pr and temperature. $\left(\text{Given } \gamma = 1.42^{1.4} = 2.64\right)$.

16. Show that for a perfect gas $\left(\frac{\partial u}{\partial v}\right)_T = 0$.

17. Find the efficiency of a Carnot's engine working between 127°C and 27°C. It absorbs heat. How much heat is rejected ?

18. Find the change in entropy when a perfect gas expands isothermally and adiabatically.

19. Calculate the specific heat of saturated steam. Given that the specific heat of w 100°C = 1.01 and latent heat of vaporization decreases with increase in temperature at the 0.64 cal/K. Latent heat of vaporization of steam is 540 cal.

Section C (Essay type)

(Ceiling = 30

Essays - Answer in about two pages, any **one** *question.*

Answer carries 10 *marks.*

20. Derive the Maxwell's thermodynamic relations from thermodynamic potentials functions

21. Discuss with necessary theory the construction, working of a Carnot engine and derive an exp for its efficiency.

(1 × 10= 1