(6 pages)

Reg. No. : ....

Code No. : 10435 E   Sub. Code : CMPH 41

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2023.

Fourth Semester

Physics – Core

HEAT AND THERMODYNAMICS

(For those who joined in July 2021 onwards)

Time : Three hours   Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The basic principle of the joule Thomson effect is based on the transfer of heat _____.

    (a) Heat   (b) Temperature

    (c) Volume   (d) Entropy

2. The lowest pressure lambda point at 2.172 K is _____.

    (a) 0.0497 atm   (b) 0.003 atm

    (c) 0.0457 atm   (d) 0.0476 atm

3. What is the relation between kinetic energy (E) of a gas and its pressure (P) _____

    (a) $P = 2/3\ E$ (b) $P = 3\ E$

    (c) $P = 1/3\ E$ (d) $E = 2/3\ P$

4. Vander waals equation help us accurately define the physical state of a real _____.

    (a) Gas   (b) Solid

    (c) Liquid   (d) Semi solid

5. Thermal conductivity of material is a measure of its ability to conduct

    (a) Heat   (b) Volume

    (c) Temperature   (d) Entropy

6. A black body is an idealized physical body that _____ absorbs all incident electromagnetic radiation.

    (a) absorbs   (b) emit

    (c) reflect   (d) conduct

7. First law of thermodynamics also known as the law of conservation of _____.

    (a) energy   (b) momentum

    (c) mass   (d) density

8. Carnot cycle has _____ efficiency in all cycle.

    (a) Maximum

    (b) Minimum

    (c) Both minimum and maximum

    (d) None

9. The third law of thermodynamics states that the entropy of pure crystal at absolute zero is _____.

    (a) zero   (b) low

    (c) high   (d) medium

10. The behavior of carnot engine best understand by using _____ diagram.

    (a) TS   (b) VS

    (c) HT   (d) V-I

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) State and explain Joules Kelvin effect.

    Or

    (b) To write any five applications of low temperature.

12. (a) Explain about kinetic theory of gas.

    Or

    (b) State and determine Wonder walls constant.

13. (a) State and explain thermal conductivity.

    Or

    (b) To Describe about black body radiation.

14. (a) State and explain zeroth law of thermodynamics.

    Or

    (b) What are the difference between otto engine and diesel engine?

15. (a) How to draw the temperature entropy diagram?

Or

(b) State and explain third law of thermodynamics.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) What is the difference between liquefaction hydrogen and helium gas?

Or

(b) Describe the process of production low temperature.

17. (a) Briefly explain maxwells law of distribution of molecular velocities.

Or

(b) To write relation between the wander walls constant critical constant.

18. (a) To give the detail explanation about thermal conductivity of good conductor.

Or

(b) Explain construction and working of Lee's disc method with suitable diagram.

19. (a) Explain work done during the adiabatic and isothermal process.

Or

(b) Explain construction and working of carnot engine with suitable diagram.

20. (a) What are the effect of pressure on melting and boiling point?

Or

(b) To derive the expression of maxwells thermodynamics relation and its application.

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