QP CODE: 23505502

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Reg No : .....

Name : .....

INTEGRATED MSC DEGREE EXAMINATION, APRIL 2023

First Semester

INTEGRATED MSC BASIC SCIENCE-PHYSICS

CORE - IPH1CR04 - THERMAL PHYSICS

2021 Admission Onwards

4388B950

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. What is meant by a homogenous system?
2. What is meant by equation of state of a thermodynamic system?
3. Give the expression for work done during an isothermal and adiabatic change.
4. Differntiate between source and sink of a heat engine.
5. Explain the term isoentropics.
6. What is the physical significance of thermodynamic potentials?
7. Distinguish between conduction and radiation.
8. Write down the general equation that represents the rectilinear flow of heat along a bar of uniform area of cross section.
9. Mention any two applications of heat radiations.
10. Define solar constant.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Explain zeroth law of thermodyanmics and the concept of temperature.
12. Derive the relation between heat capacity at constant volume and constant temperature
13. Explain Carnot's cycle.

14. Bring out the physical significance of entropy.

15. Calculate the change of entropy in converting a mole of gas occupying 20 litres at a pressure of 2*105 N/m^2 to occupying 50 litres at a pressure of 5*105 N/m^2. Given R = 8.4 J mol^{-1} K^{-1} and C = 21 J mol^{-1} K^{-1}.

16. Why the zero on absolute scale is considered to be the lowest possible temperature?

17. Deduce Stefan-Boltzmann Law

18. Give the theory of spherical shell method to find out the coefficient of thermal conductivity of a material.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Define first law of thermodynamics. Derive the differential form of first law and explain the law in the case of two processes.

20. Define Carnot's engine and explain the work done per cycle.

21. a) What do you mean by thermal radiations? Explain the nature and properties of thermal radiations. B) Explain the terms emissive power, absorbtive power and radiant emittance

22. What is quantum theory of radiation? Derive Planck's formula for the distribution of energy in the spectrum of a black body. Deduce from it Wein's displacement law and Rayleigh -Jeans law.

(2×5=10 weightage)