NORTH GAUHATI COLLEGE
DEPARTMENT OF PHYSICS
B.SC. 3RD SEMESTER (HONORS) CBCS
SUB: THERMAL PHYSICS (PHY-HC-3026)

ASSIGNMENT - I

LAST DATE OF SUBMISSION: August 10, 2021 **TOTAL MARKS: 20**

The figures in the brackets indicate the full marks for each question

1. Explain the working of a heat engine and a refrigerator using appropriate diagrams. [**4**]

2. Two Carnot Engines A and B are operated in series. The first one A receives heat at 900 Kelvin and rejects to a reservoir at temperature 'T' Kelvin. The second engine B, receives the heat rejected by the first Engine and then rejects to a heat reservoir at 400 Kelvin. Calculate the temperature 'T' for the following two situations:
   (a) The work outputs of the two engines are equal.
   (b) The efficiency of the two engines are equal.
   [Hint: Engine A takes in heat Q_1 at temperature T_1 and rejects heat Q at temperature T; and engine B takes in heat Q at temperature T and rejects heat Q_2 at temperature T_2] [**6**]

3. Derive Maxwell's thermodynamic relations. Write their applications. [**4+6**]

General instructions for submission:

- ★ Write your answers in **A4 size paper** clearly mentioning your **name, GU roll number, registration number, paper code, email address**, etc. on the **first page** of your answer sheets.
- ★ You need to make a **single PDF file** of your assignments and **upload** them on the **online portal of our college** (by clicking the 'upload' button next to the 'view' button on the assignment page).
- ★ Only if you are **unable to upload** on the website, you may send the assignment mentioning proper **course code and assignment number as subject** to the email: **ngcphysicsdept@gmail.com**