DEPARTMENT OF PHYSICS

R.C.S. COLLEGE, MANJHAUL

(A CONSTITUENT UNIT OF L.N. MITHILA UNIVERSITY, DARBHANGA)

BEGUSARAI (BIHAR) PIN - 851 127

Email ID : principalrcscollege@gmail.com | www.rcscollege.ac.in

Ph. : +91 8544513326

Ref. No. ..... Date .....

Subject: **Physics**

Name of the Course: -**Thermal Physics & Thermodynamics**

Course Code: **MJCPHY03**

Semester: **Semester-III,** Session**: 2024-2028**

Answer all questions.

Q.1

State Carnot's theorem and show that it is a necessary consequence of second law of thermodynamics. Prove that the efficiency of a Carnot engine using an ideal gas as a working substance is

$$\eta = \frac{T_1 - T_2}{T_1}$$

Q.2

State assumptions of kinetic theory of gases.

Q4.

Define mean free path and obtain the law of distribution of free paths.

DEPARTMENT OF PHYSICS

R.C.S. COLLEGE, MANJHAUL

(A CONSTITUENT UNIT OF L.N. MITHILA UNIVERSITY, DARBHANGA)

BEGUSARAI (BIHAR) PIN - 851 127

Email ID : principalrcscollege@gmail.com | www.rcscollege.ac.in

Ph. : +91 8544513326

Ref. No. ..... Date .....

Assignment

Subject: **Physics**

Name of the Course: - **Electricity&Magnetism (T)**

Course Code: **MJCPHY04**

Semester: **Semester-III,** Session**: 2024-2028**

Answer all questions.

Q. 1

a. State and Prove Ampere's circuital law for any arbitrary closed path. Apply this law to obtain magnetic induction vector $\vec{B}$ inside and outside a toroid.

b. A solenoid 2 m long with a mean diameter of 0.05 m has two layers of 1000 turns of wire each. Calculate the magnetic flux density at its centre when a current of 2.5 A flows through it. Also calculate the magnetic flux at centre.
($\mu = 4\pi \times 10^{-7}$ H/m).

Q. 2

a. The electric potential in a given space is represented by V = 3x + 5y - 6z. Show that the electric field intensity is uniform everywhere in the given space.

b. An electron circulates around a nucleus in an orbit of radius 5.1×10^{-11} m at a frequency of 6.8×10^{-15} revolutions per second. Calculate B at the centre of the orbit.