## 10+10+10+10+10=60 1



INDIAN INSTITUTE BATCH P19/2 NO.2381220 CLASS NAME KHYATI SINGH TECHNOLOGY BOMBAY EXPT. No. 05 LABORATORY PHYSICS DEPT. DATE 4|09|23

## Helmholtz coils

Aim: (a) To measure the magnetic field produced by the Helmholtz call.

- (b) 20 determine the tonque experienced by a current corrying loop, suspended between the Helmholtz coils, as a function of:
- (i) the strength of the magnetic moment (by varying current "is" through the
- (ii) the angle (a) between the magnetic field and the axis of the loop.

(iii) the no. of turns (n) in the current loop.

apparatus: Helmholtz coils, digital Gaussmeter, Hall probe, Torsion dynamometer, power supply with inbuilt digital ammeter, connecting wires, supporting stand and two small coils having n=1 and 3.

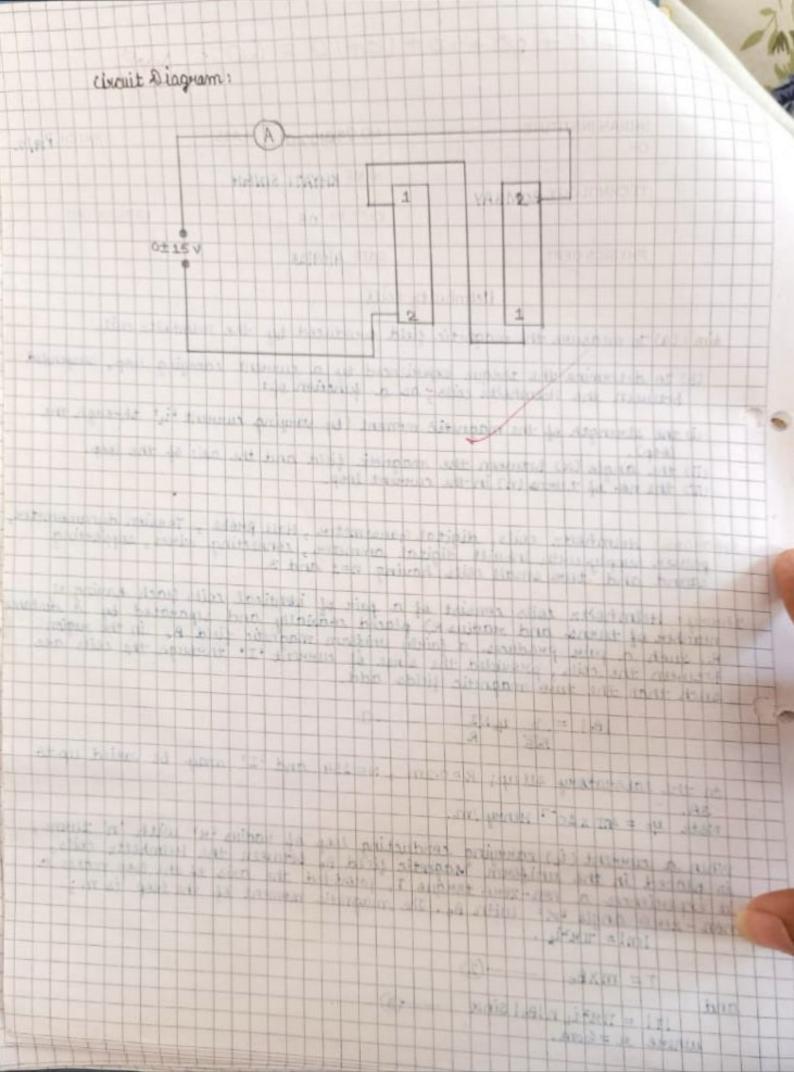
Theory: Helmhettz coils consist of a pair of identical coils (each having N number of turns and radius R) placed coaxially and separated by a distance R. Such a pain produces a fairly uniform magnetic field B. in the region between the coils, provided the sinse of current 'I' through the coils are such that the two magnetic fields add.

$$|\theta_0| = 8 \quad \psi_0 N I \qquad D$$

on the laboratory setup; R=0.2m, N=154 and 'I' may be varied up to 3A. Note 40 = 411 x 10 " Herry /m.

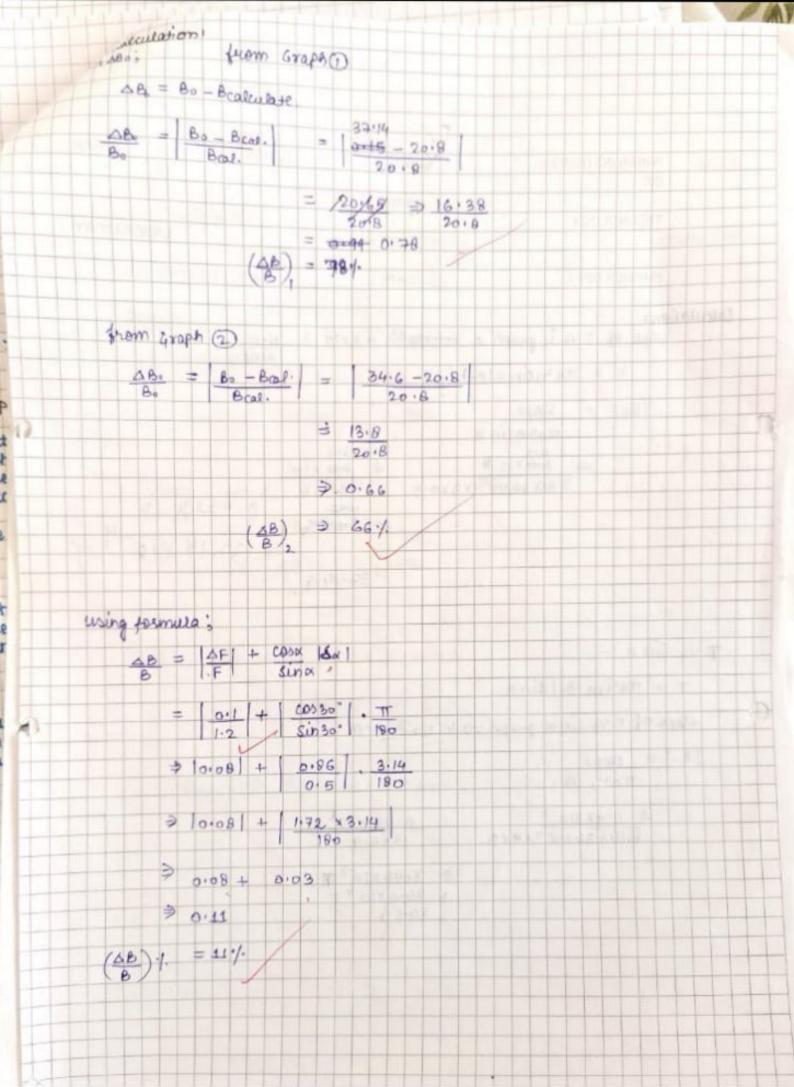
when a current (i) carrying conducting loop of radius 'x' with 'n' turns, is placed in the uniform magnetic field Bo between the Helmholtz coils, it experiences a non-zero torque T, provided the axis of the loop makes a non-zero angle 'x' with Bo. The magnetic moment of the loop is m; Im! = THEL.

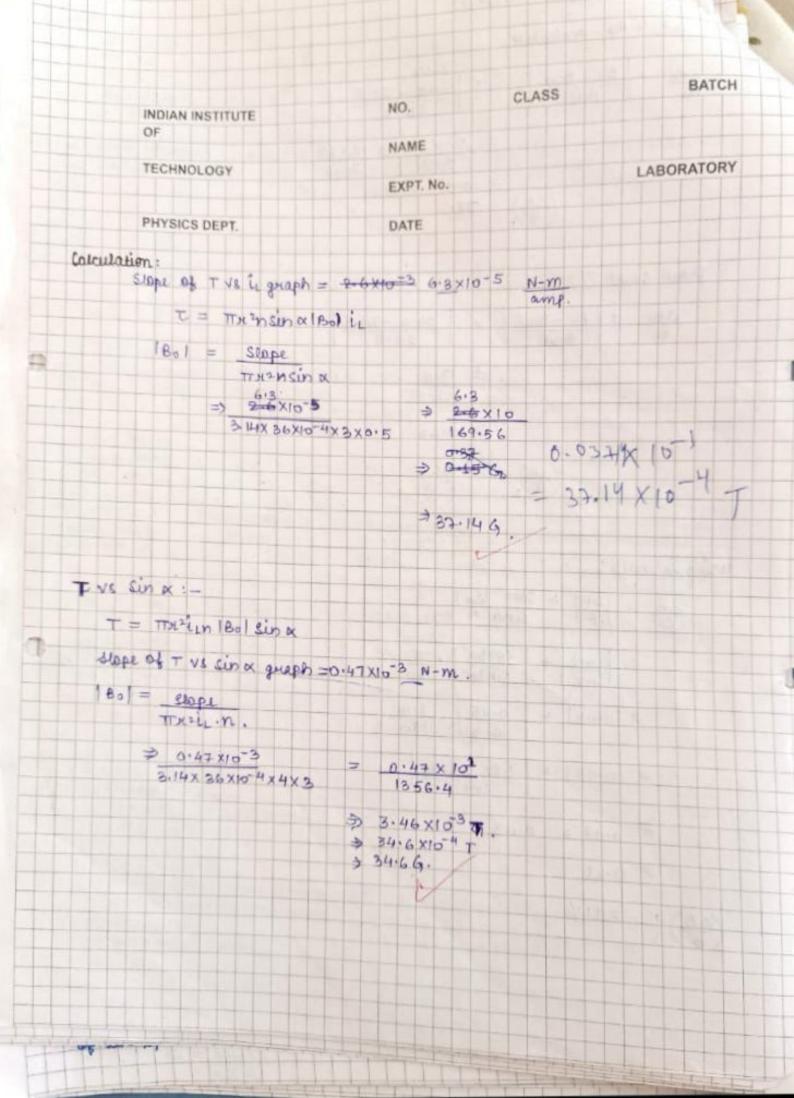
-(2) T = mxBo and ITI = TIX2 in 1801 Sing - 3 where is = 60m.



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