



LABORATORY WORK SHEET

Date: 26/09/23

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Exp No: 01 Experiment Name: Motorized Gyroscope

DAY TO DAY EVALUATION:

	Preparation	Algorithm	Source Code	Program Execution	Viva voce	Total
		Performance in the Laboratory	Calculations and Graphs	Results and Error Analysis		
Max. Marks	5	5	10	5	5	30
Obtained	4	4	4	3	3	18


Signature of Lab I/C

START WRITING FROM HERE:

Aim: To study gyroscopic effect of rotating disc

Apparatus: Gyroscopic test rig, stopwatch, Tachometer.

Materials required: Electricity supply, single Phase, 220AC, 50Hz, 5AMP socket with earth connection Tachometer, bench area required (1m x 1m).

Procedure:

- * set the rotor at zero position.
- * start the motor with the help of rotary switch
- * Increase the speed of rotor with diameter stack, stable it measure.
- * rpm with the help of Tachometer.
- * Put the weight on weight pan. Then rotate at anti clockwise direction.
- * measure the rotating angle with the help of stopwatch
- * Repeat the experiment for the various speeds & load

* After the test is over. set diameter/dimmer start at zero position and switch off main supply.

Observation:

$$g = 9.81 \text{ m/s}^2, r = 150 \text{ mm} / 0.15 \text{ m}$$

$$W = 5.8 \text{ kg}, L = 160 \text{ mm} / 0.16 \text{ m}$$

Tabulation:

S.No	Speed (N) rpm.	weight (kg)	Angle of precision	Time recorded.
1.	945	0.500	30°	16
2	1510	0.650	5°	30
3.	7312	0.500	2°	50

Calculation:

$$T = I \omega \times \omega_p = 6.65 \times 10^{-5} \times 98.76 \times 8.72 \times 10^{-3}$$

$$= 5.72 \times 10^{-3} = 0.005 \text{ kg}$$

$$I = \frac{mv^2}{2} = \frac{5.8}{9.81} \times \frac{(6.15)^2}{2} = 6.65 \times 10^{-3}$$

$$\omega = \frac{2\pi N}{60} = \frac{2 \times 3.1415 \times 94.5}{60} = 98.96$$

$$\omega_p = \frac{d\theta}{dt} \times \frac{\pi}{180} = \frac{30}{90} \times \frac{\pi}{180}$$

$$T_{\text{actual}} = 0.005 \text{ kg.m.}$$

Precautions:

- 1) Never run the apparatus if power supply is less than 180V and above 230V
- 2) Before start of motor, set dimmer stat at zero position.

Applications:

- 1) Naval ships
- 2) Aircraft
- 3) Automobiles.

Result:

The theoretical gyroscopic couple,

$$T_{\text{theoretical}} = 0.008 \text{ kg.m.}$$

$$T_{\text{actual}} = 0.005 \text{ kg.m}$$