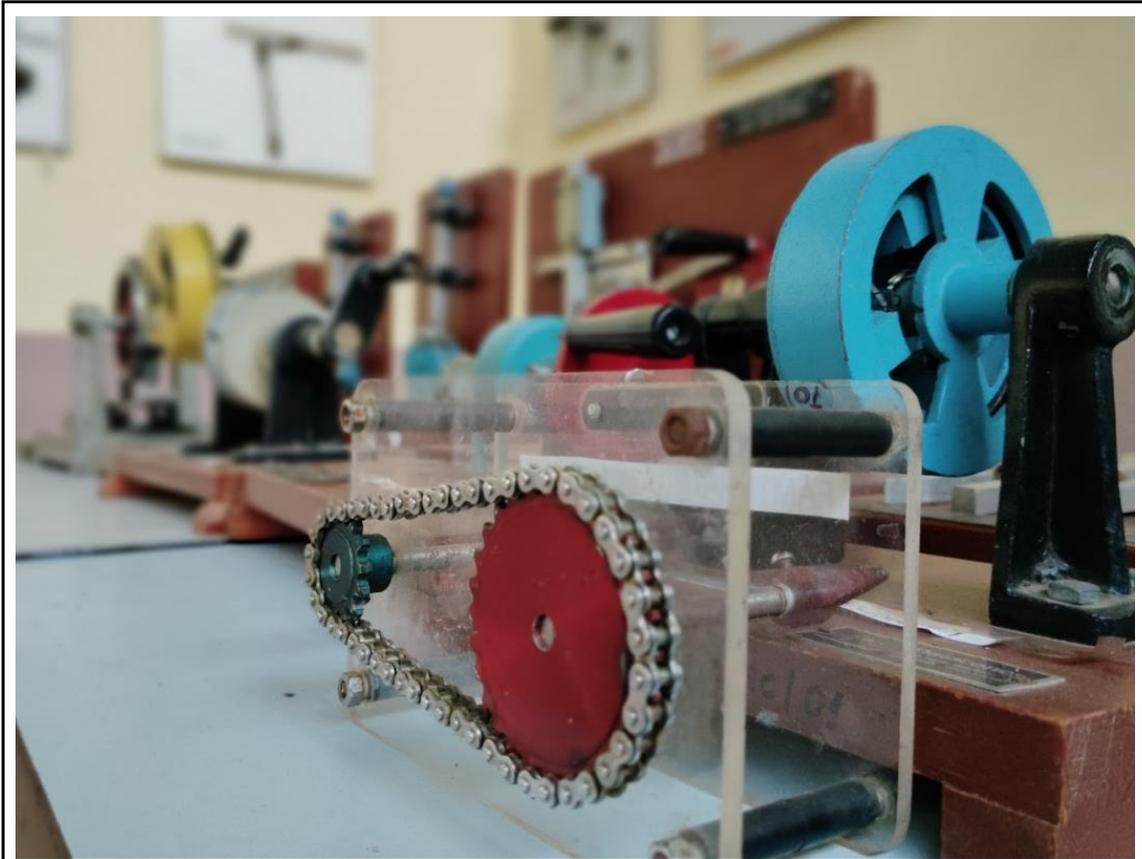


Kinematics of Machinery & Dynamics of Machinery Lab



22. KOM DOM Lab

This lab is equipped with machinery to study the principles of motion, force, and vibration in mechanical systems. It enables students to explore the dynamic behavior of mechanisms and machines, enhancing their understanding of concepts such as gyroscopic effects, balancing, vibrations, and shaft whirling. The lab facilitates hands-on learning in the areas of kinematics and dynamics, critical for mechanical engineering applications.

Equipment



23 Motorized Gyroscope

A motorized gyroscope is used to study the principles of gyroscopic motion, including precession and nutation. It consists of a rotating disc (rotor) driven by a motor, demonstrating how angular momentum conservation influences the orientation of the system.

Specifications:

Make: Datacone Pvt. Ltd., Sangli

Motor: 0.25 HP, 6000 RPM

Mass of Rotor: 6.25 kg

Diameter of Rotor: 300 mm

Thickness of Rotor: 12 mm

Mass Moment of Inertia: 0.0703 kg-m³



24 Universal Governor

A governor is a mechanical device used to regulate the speed of an engine by adjusting the fuel or working fluid supply. The system ensures stable operation under varying load conditions. The various types of governors have distinct designs and principles for maintaining speed control.

Specifications:

Make: Datacone Pvt. Ltd., Sangli

Motor: 0.25 HP, 1500 RPM

Maximum Sleeve Displacement: 120 mm

Weight for Porter Governor: 2 kg

Types of Governor:

- Watt
- Porter
- Proell
- Hartnell



The whirling of shaft apparatus is used to demonstrate the critical speed of a rotating shaft when it starts to vibrate or whirl due to unbalanced forces. This helps in studying the behavior of shafts under various loading and support conditions.

Specifications:

Make: Datacone Pvt. Ltd., Sangli

Motor: 1/6 HP, 5000 RPM

Types of Support:

25 Whirling of Shaft apparatus

- Fixed
- Simply Supported
- Fixed–Simply Supported

Diameter of Shaft:

- 4.7 mm
- 6.4 mm
- 7.9 mm



26 Vibration Test Rig

A vibration test rig is designed to study the dynamic behavior of mechanical systems under oscillatory motion. It helps simulate and analyze various vibration modes, frequencies, and amplitudes, providing valuable insights into structural integrity and fatigue resistance.

Specifications:

Make: Datacone Pvt. Ltd., Sangli

Motor: 0.15 HP, 1500 RPM

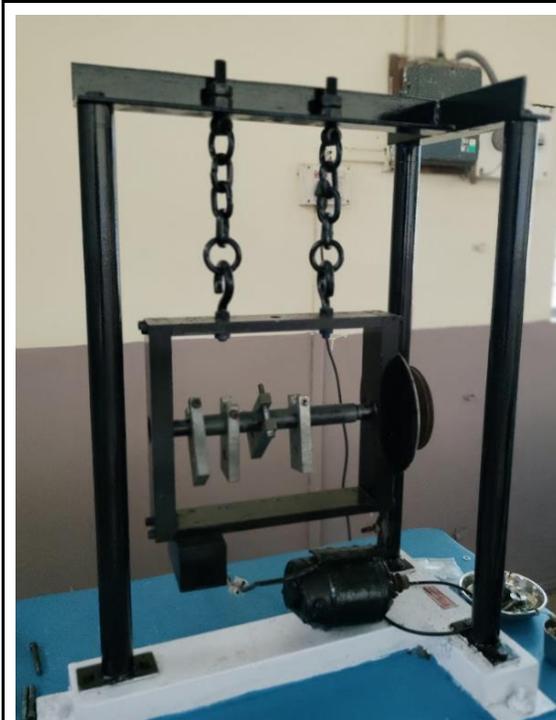
Disc A:

- Diameter: 225 mm
- Mass: 2.85 kg

Disc B:

- Diameter: 190 mm
- Mass: 2.0 kg

Length Between Supports: 1110 mm



27 Balancing Apparatus

The rotating mass balancing apparatus is used to demonstrate the principles of dynamic balancing in rotating systems. It helps visualize how unbalanced masses affect the system and how corrective measures can achieve smooth operation.

Specifications:

Make: Datacone Pvt. Ltd., Sangli

Motor:

- Capacity: 0.5 HP
- Speed: 6000 RPM

Length of Shaft: 190 mm

Diameter of Shaft: 24 mm

List of Experiments

1. Performance testing of Porter governor
2. Performance testing of Hartnell governor
3. To study the Gyroscopic behavior of spinning body & to calculate the gyroscopic couple.
4. To determine natural frequency of compound pendulum, equivalent simple pendulum system
5. To find the natural frequency for longitudinal vibrations of helical springs connected in series to a mass suspended vertically
6. To find natural frequency of Torsional Vibration of single rotor and shaft system
7. To find natural frequency and nodal points of free Torsional vibration of two rotor system.

8. To determine the fundamental and second frequencies of a rotating shaft exhibiting whirling.
9. Measurement of vibration response of a system
10. To check experimentally the method of calculating the position of counter balancing mass in rotary mass systems.