

**EVALUATION OF PHYSICO-CHEMICAL AND
TRIBOLOGICAL PROPERTIES OF ENGINE OIL
DISSIPATED WITH TITANIUM OXIDE
NANOPARTICLES**

**A PROJECT REPORT SUBMITTED FOR THE PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR AWARD OF DEGREE OF**

**BACHELOR OF TECHNOLOGY
IN
MECHANICAL ENGINEERING**

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**(Permanently affiliated to JNTU-Gurajada Vizianagaram, Accredited by NAAC A+, Approved by AICTE,
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DEPARTMENT OF MECHANICAL ENGINEERING
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CERTIFICATE

This is to certify that the project entitled **“EVALUATION OF PHYSICO-CHEMICAL AND TRIBOLOGICAL PROPERTIES OF ENGINE OIL DISSIPATED WITH TITANIUM OXIDE NANOPARTICLES”** is the record of the work carried out by **BODDETI PAVAN KUMAR (20811A0307)**, **JAJULA POORNA CHANDRA (20811A0313)**, **GORLI VENKATA RAMA KRISHNA (20811A0312)**, and **PATCHIPULUSU GANESH (20811A0331)** students of final year B. Tech in the department of Mechanical engineering. This work is done for the partial fulfillment for the award of BACHELOR OF TECHNOLOGY during the year 2024-2025.


Project Guide

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ABSTRACT

The physico-chemical and tribological properties of HP Racer 4 engine oil dissipated with inorganic nanoparticles such as TiO₂ were evaluated using a Four Ball Tester. Samples are prepared by dissipating the nanoparticles in different weight percentages in engine oil. These nanoparticles are made stable in the lubricant by adding different surfactants such as SPAN 80.

The stability of the lubricant with nanoparticles dissipated in it is evaluated by studying its ultraviolet-visible spectra. Using a Four Ball Tester, the anti-wear and anti-friction properties of the samples are tested, and an evaluation of the TiO₂ nanoparticles with surfactants SPAN 80 is done to compare their relative performances. Based on the load applied the friction and wear characteristics of lubricants dissipated with nanoparticles vary.

It is observed that there is a significant reduction in the coefficient of friction when the base oil is dissipated with TiO₂ nanoparticles in SPAN 80 surfactant. The results obtained from this investigation will be used to develop new and efficient lubricants for automotive engine applications.