Department of Mechanical Engineering
Indian Institute of Technology New Delhi
I Semester -- 2023 – 2024

MCL 721 *AUTOMOTIVE PRIME MOVERS*

PROBLEM SET – 2: Modelling of Present-day Engines using Air-standard Otto & Diesel Cycle

Problem Statement 1: Ford EcoSport had won the most number of awards amongst launches in the calendar year 2013. The EcoSport comfortably seat 5 passengers, all while being fully adjustable to accommodate all your gear. So immerse yourself in the Endeavour's luxurious dual-toned interior and let the EcoSport's 20 specialized storage compartments keep your trips perfectly organized. There are many variants of Ecosport. Following table shows engine specifications of a selected model.

Details	1.5P Ambiente
Displacement (cc)	1499
Max Power output(kW)	82@6300RPM
Max. Torque (Nm)	140@4400RPM
Compression Ratio	11:1
Fuel calorific value (kJ/kg)	48,000

Carry out thermodynamic analysis to study the effect of compression ratio and Maximum temperature on engine performance and size using Air Standard and Variable Property Otto Cycles.

Problem Statement 2: The Diesel variant of Ecosport is having following engine specifications.

Details	1.5D Ambiente
Displacement (cc)	1498
Max Power output(kW)	67@3750RPM
Max. Torque (Nm)	204 @ 2750RPM
Compression Ratio	16:1

Fuel calorific value (kJ/kg)	44.800

Carry out thermodynamic analysis to study the effect of compression ratio, cut-off ratio and Maximum temperature on engine performance and size using Air Standard and Variable Property Diesel and Dual cycles.