

**MECHANICAL ENGINEERING DEPARTMENT
MEL816: ANALYSIS OF I.C. ENGINE PROCESSES**

MAJOR PART 1

9-5-2007

TOTAL TIME: 2 HOURS

TOTAL MAXIMUM MARKS 30

PLEASE BE VERY BRIEF AND TO THE POINT!

USE OF BOOKS AND NOTES NOT ALLOWED

THIS IS PART A AND IS WORTH 10 MARKS

ALL QUESTIONS CARRY EQUAL MARKS

TO BE RETURNED BEFORE TAKING PART B

1. There are two similar spark ignition engines, one with a spark timing of 25 degrees btdc and the other with 40 degrees btdc. Which engine would have a greater time loss and why?
2. What is the effective gas temperature of the cylinder head?
3. How would you account for ignition delay in a diesel engine when modeling the combustion process?
4. How does the efficiency of an equivalent fuel-air cycle typically compare with that of a real cycle for a petrol engine?
5. In a spark ignition engine model, how will you determine the burned gas volume at a given crank angle?
6. What is the main use of a multi-dimensional model when working on a phenomenological type of model?
7. Show a typical plot of NO versus crank angle in a petrol engine.
8. How would you model the disappearance of unburned hydrocarbons in a spark ignition engine?
9. What is a suitable method of predicting the brake power of a diesel engine?
10. What procedure would you follow to predict the mass flow rate of air at the exit of the inlet valve of a diesel engine?