

# ME 201

## Thermodynamics

### Homework #20, Due Wednesday, April 19, 2006

1. Consider an internal combustion engine operating on the ideal Dual cycle with the following conditions:

Two cylinder, four stroke engine with displacement of 1.6 liters

Compression ratio of 7.5

Cutoff Ratio of 1.7

Combustion temperature of 1700 K

Engine speed of 1300 rpm

The initial temperature and pressure are taken to be 150 kPa and 315 K due to turbocharging of the intake air. Just before the final process (constant volume cooling) 85% of the air is extracted and is used to power a turbine that supplies power to the intake compressor (i.e. the turbocharger). Determine

- a. engine thermal efficiency
- b. engine power output
- c. engine MEP
- d. exhaust turbine power