

Name:

Grade:

Due Date: 11/10/2021 (Due at the time of class)

Solve the following problems. Clearly justify all your assumptions.

Problem 1:

As a three-cylinder, 1.5 liter, two-stroke cycle, spark ignition engine runs at 3400 RPM, there are 0.000440 kg of gases trapped in the each cylinder during the cycle. This includes 4.60% exhaust residual from the preceding cycle. At this condition, the engine has a trapping efficiency $\lambda_{te} = 0.760$.

Calculate:

- (a) delivery ratio.
- (b) charging efficiency.
- (c) scavenging efficiency.
- (d) relative charge.

Problem 2:

(a) Why is the compression ratio of an SI engine often reduced when the engine is re-designed to be used with a turbocharger? (b) Is brake power increased or decreased? (c) Is thermal efficiency increased? (d) Why isn't reducing the compression ratio as important when a turbocharger is added to a CI engine design?