Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

A Constituent Institute of Manipal University, Manipal

V SEMESTER B.TECH (MECHANICAL / I&P ENGG.) END SEMESTER MAKE-UP EXAMINATIONS, DECEMBER 2017

SUBJECT: THEORY OF INTERNAL COMBUSTION ENGINES AND EMISSIONS (PE-I) (MME 4036)

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1. (A) Explain the effect of dissociation on the work output of the engine. (5 Marks)

1. (B) What are the factors which affect the efficiency of actual cycle? Explain. (5 Marks)

2. (A) Can you run an automobile on hydrogen without burning it? Explain. (3 Marks)

2. (B) How is crude petroleum distilled? (4 Marks)

2. (C) Explain the ASTM standard protocols used to determine Octane number. (3 Marks)

3. (A) The gravimetric analysis of a sample of coal is given as 82% C, 10% H_2 and 8% ash. Determine the stoichiometric A/F ratio. (2 Marks)

3. (B) Calculate the theoretical A/F ratio for the combustion of octane, C_8H_{18}. The combustion equation is: (2 Marks)

$$C_8H_{18} + 12.5\ O_2 + 12.5\ (3.76)\ N_2 \rightarrow 8CO_2 + 9H_2O + 12.5\ (3.76)\ N_2.$$

3. (C) Explain the reasons for which CI engine is not much favored in passenger cars. (3 Marks)

3. (D) Explain the phenomenon of knocking in SI engines. What are the different factors which influence the knocking? (3 Marks)

4. (A) What are the advantages and disadvantages of CRDI system (3 Marks)

4. (B)	Discuss any three factors affecting combustion in a dual fuel engine.	(3 Marks)
4. (C)	Wankel rotary engine could not become successful. Why?	(2 marks)
4. (D)	What is a stratified engine?	(2 Marks)
5. (A)	What are the sources of evaporative emission in SI engine? How it can be controlled?	(3 Marks)
5. (B)	Write the Zeldovich equations. Explain its significance.	(3 Marks)
5. (C)	Explain the working of thermal reactor with neat sketch.	(4 Marks)