Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

A Constituent Institute of Manipal University, Manipal

V SEMESTER B.TECH (MECHANICAL / IP ENGG.) END SEMESTER EXAMINATIONS, NOVEMBER 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) With neat sketches explain idealized air standard Otto and diesel cycles and write the expressions for their efficiency. (5 Marks)

1. (B) With neat sketches explain the effect of compression ratio on the brake thermal efficiency of Otto cycle. (5 Marks)

2. (A) Explain the effect of volatility on engine performance. (4 Marks)

2. (B) What role can addition of alcohol play in SI engine combustion? Explain. (3 Marks)

2. (C) How the rating of a fuel can be increased? Explain. (3 Marks)

3. (A) Methane (CH_4) is burned with atmospheric air. The analysis of the products on a dry basis is as follows: CO_2 = 10%, O_2 = 2.37%, CO = 0.53%, N_2 = 87.10%. (3 Marks)

(i) Determine the combustion equation; (ii) Calculate the air-fuel ratio;
(iii) Percent theoretical air.

3. (B) "The factors that tend to increase detonation in SI engines tend to reduce knocking in CI engine". Discuss this statement with reference to the following influencing factors: (i) Compression ratio; (ii) Self ignition temperature; (iii) Combustion chamber wall temperature; (iv) Inlet temperature (4 Marks)

3. (C) Explain the factors affecting delay period in CI engines. (3 Marks)

4. (A)	Explain the construction of Wankel rotary combustion engine.	(4 Marks)
4. (B)	List the advantages and disadvantages of stratified charge engines.	(4 Marks)
4. (C)	What are the limitations of TBI system?	(2 marks)
5. (A)	Explain the factors which affect the formation of NOx.	(3 Marks)
5. (B)	Explain the mechanism of smoke formation.	(3 Marks)
5. (C)	What is Three way catalytic converter? Explain the working of Three way catalytic converter.	(4 Marks)