Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

IV SEMESTER B. TECH (OPEN ELECTIVE- I)

END SEMESTER EXAMINATIONS, APRIL 2018

SUBJECT: INTERNAL COMBUSTION ENGINES [MME 3284]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.
- Use of Thermodynamics data hand book is permitted

1A. What causes disintegration of product molecules? What are its effects? How does it affect SI and CI engine combustion? Use sketches wherever necessary. **3**

1B. Explain briefly variables affecting knock in SI engines. **3**

1C. With neat sketches explain sterling cycle and sterling engines **4**

2A. With a neat sketch explain the analysis of combustion products by means of ORSAT apparatus. **3**

2B. Elaborate on the following: **3**

i) Enthalpy of Combustion

ii) Adiabatic flame temperature

2C. A hydrocarbon fuel contains 86% carbon and 13% hydrogen by mass and remaining is incombustible material. 25kg of air is supplied per kg of fuel. Find the percentage of excess air. If the exhaust gases are at 1.5 bars and 430^0C and room temperature is 30^0C, find the heat carried away by exhaust gases. Assume Cp(dry gases)= 1kJ/kg. **4**

3A. A certain indirect injection type combustion chamber uses squish. A single hole type nozzle is largely used in this kind of combustion chambers. Explain the working of the combustion chamber with a neat sketch. **3**

3B. With neat sketches explain the engine characteristics with respect to the variation of stroke length and bore diameter. **3**

3C. i) Using a table mention eight variables that can cause knocking and its effect on the unburnt charge. Also, mention if they can be controlled by the operator. **4**

ii) Explain how injection advance/ retardation angle affects the delay period with suitable pressure crank angle graphs.

4A.	Why are diesel engines preferred over petrol engines for turbocharging or supercharging ?	**3**
4B.	Water plays a major role in maximizing the utilization of heat from combustion process. With neat sketches explain the working of an engine which is used for the same purpose.	**3**
4C.	If a rotary engine was to be run in the dual fuel mode with Petrol and Natural gas, what modifications and attachments are to be incorporated in the existing system? Explain with a neat sketch.	**4**
5A.	Explain the working of Bosch Motronic system with a neat sketch.	**3**
5B.	With a neat sketch explain the working of a piezoelectric sensor.	**3**
5C.	Give an application of LVDT used in relation with the speed of the engine aiding in supplying the required amount of charge into the combustion chamber. Draw the required circuit diagram indicating the same	**4**