



Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)



IV SEMESTER B.TECH (MECHANICAL AND MANUFACTURING ENGINEERING)

END SEMESTER EXAMINATIONS, MAY 2016

SUBJECT: INTERNAL COMBUSTION ENGINES [MME 3284]

REVISED CREDIT SYSTEM

Time: 3 Hours

1A.

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ALL the questions.
- ✤ Missing data may be suitable assumed.

With a neat sketch explain the working of a sterling cycle

IA.	With a fleat sketch explain the working of a sterning cycle	(05)
1B.	 Give Reason: i) Decrease in Engine speed requires retarding the spark timing ii) Variation in specific heat leads to lower work output. 	(02)
1C.	A fuel has the following composition by weight Carbon 90%, Hydrogen 8% and ash 2%. The analysis of dry flue gases gave the following values: CO_2 -14%, O_2 - 8% and remaining Nitrogen. Calculate per kg of fuel weight of necessary air and actual A/F ratio. Also find the chemical formula for the bydrocarbon fuel	
	nyurocarbon ruei.	(03)
2A.	A certain kind of engine has its working cycle based on constant volume heat addition. Explain the stages in its combustion and also the factors affecting its first stage of combustion with neat sketches.	(05)
2B.	 Give reason: i) Increasing the inlet air density in CI engines reduces knocking effect and vice versa in SI engines. ii) Improper mixture ratios lead to lower flame velocities in the combustion chamber. 	(05)
3A.	With neat sketches explain: i) Compression swirl ii) Induction swirl	
		(05)
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3B. A certain type of combustion chamber has partial combustion in its minor cell and part of it in its main combustion chamber. With a neat sketch explain its **(05)** working.

4A.	Mention the factors to be considered for supercharging an engine.	(04)
4B.	With a neat sketch explain the working of a turbocharger.	(04)
4C.	Turbo- Charging is preferred in CI engines over SI engines. Give reason.	(02)
5A.	What are the important variables to be controlled in an SI engine by an ECU? Draw a neat sketch of the BOSCH Motronic system and label all the parts.	(05)
5B.	 Explain the working and its function of the following items in an IC engine management system: i) Inductive transducer ii) Strain gauge sensor iii) Piezoelectric sensor iv) Linear variable differential transformer v) Thermocouple 	

Draw sketches wherever necessary.

(05)