

**B.Tech. - VIEP - MECHANICAL ENGINEERING
(BTMEVI)**

Term-End Examination

June, 2015

00656

BIMEE-023 : COMBUSTION ENGINEERING

Time : 3 hours

Maximum Marks : 70

*Note : Answer any **five** questions. All questions carry equal marks. Use of scientific calculator is permitted.*

1. (a) Explain briefly the combustion phenomenon in CI engine. 7
- (b) Discuss in brief the phenomenon of "Diesel Knock". State the differences in the knocking phenomenon of SI and CI engines. 7
2. (a) Describe briefly the basic methods of generating air swirl in CI engines' combustion chambers. 7
- (b) Explain in brief the combustion phenomenon in SI engines. 7

3. (a) What do you mean by pre-ignition ? How can it be detected ? 7
- (b) "The highest compression ratio that can be used in an SI engine is limited by the detonation characteristics of the available fuel" — Justify the statement. 7
4. (a) What action can be taken with regard to the following variables, in order to reduce the possibilities of detonation in an SI engine ? Justify your answer by giving reasons. 7
- (i) Compression ratio
 - (ii) Mass of charge induced
 - (iii) Mixture inlet temperature
 - (iv) Engine speed
- (b) Why is spark advance required in SI engines ? Discuss the factors that affect the ignition timing. 7
5. (a) Define "Higher Heating Value (HHV)," and "Lower Heating Value (LHV)". Explain the difference between Higher Heating Value (HHV) and Lower Heating Value (LHV). 7
- (b) Calculate the amount of theoretical air required for the combustion of 1 kg of acetylene (C_2H_2) to CO_2 and H_2O . 7

6. (a) State the relative advantages and disadvantages of battery and magneto-ignition systems. 7

(b) The chemical analysis of a fuel by weight is as follows :

Carbon = 50 percent;

Hydrogen = 25 percent;

Oxygen = 10 percent;

Sulphur = 5 percent; and

Nitrogen = 10 percent.

Find the stoichiometric amount of air required for complete combustion of this fuel. 7
