

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII (NEW) EXAMINATION – WINTER 2018****Subject Code: 2180210/2180215****Date: 19/11/2018****Subject Name: Automptive And Combustion Engine Technology****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) What is engine downsizing? **03**
 (b) How is stratified charge combustion achieved? **04**
 (c) What are the types of nozzle used in gasoline direct injection? Also explain their constructional features. **07**
- Q.2** (a) What is lean boost direct injection (LB DI) concept? **03**
 (b) Explain Lean NO_x trap **04**
 (c) What are the problems associated with turbo charging the spark-ignition engine? Explain any two of the problems in detail. **07**
- OR**
- (c) Describe the three combustion concepts (wall, air and spray) for the implementation of mixture preparation of gasoline direct injection **07**
- Q.3** (a) Write short notes on exhaust emission. **03**
 (b) Explain the salient features of the first-generation **04**
 (c) Describe the different approaches to HCCI operation in gasoline engines? **07**
- OR**
- Q.3** (a) Write short notes on exhaust gas treatment on fuel economy. **03**
 (b) Explain the salient features of the second-generation **04**
 (c) With a neat sketch explain thermodynamic analysis of gasoline direct injection at part-load condition. **07**
- Q.4** (a) Write short notes on engine knock **03**
 (b) Mention the advantages of direct injection system. **04**
 (c) Describe how the selective catalytic reduction (SCR) NO_x control as an alternative to lean NO_x traps (LNT). **07**
- OR**
- Q.4** (a) Draw a diagram of a typical DI gasoline engine with sensors and control **03**
 (b) Explain the conventional diesel combustion with a neat sketch. **04**
 (c) Explain the principle of autoignition combustion in the gasoline engine. **07**
- Q.5** (a) What is turbo charging? **03**
 (b) With a neat sketch explain the process of turbo charging? **04**
 (c) Describe the different approaches to HCCI operation in gasoline engines? **07**
- OR**
- Q.5** (a) Explain the thermodynamic aspects of gasoline direct injection **03**
 (b) Differentiate turbo charging and super charging. **04**
 (c) Describe the fundamental principle of HCCI combustion in gasoline engines. **07**
