

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE – SEMESTER-VIII EXAMINATION- SUMMER 2019****Subject Code:2180215****Date:02/11/2020****Subject Name: Automotive 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.

|            |  | <b>MARKS</b> |
|------------|--|--------------|
| <b>Q.1</b> | (a) List the advantages of engine downsizing.  | <b>03</b>    |
|            | (b) What are the types of nozzle are used in gasoline direct injection?  | <b>04</b>    |
|            | (c) Explain the combustion phenomenon for gasoline engine.   | <b>07</b>    |
| <b>Q.2</b> | (a) What is charge stratification combustion?  | <b>03</b>    |
|            | (b) Explain supercharging of engine.   | <b>04</b>    |
|            | (c) Explain the reasons of knocking in SI Engine. List various methods to reduce knocking.   | <b>07</b>    |
| <b>OR</b>  |  |              |
|            | (c) Explain salient feature of spray guided combustion system for gasoline direct injection  | <b>07</b>    |
| <b>Q.3</b> | (a) Enlist various after treatment technologies for diesel and gasoline vehicle.   | <b>03</b>    |
|            | (b) What is lean boost direct injection (LBDDI) concept? Explain the working principle of LBDDI  | <b>04</b>    |
|            | (c) What are the advantages of combining direct injection and turbo charging in spark-ignition engine?                                 | <b>07</b>    |
| <b>OR</b>  |  |              |
| <b>Q.3</b> | (a) What is internal exhaust gas recirculation system and external exhaust gas recirculation system?                                   | <b>03</b>    |
|            | (b) What is auto ignition phenomenon? What is the basic difference between auto ignition combustion and SI combustion?                 | <b>04</b>    |
|            | (c) Explain effect of different properties of gasoline on combustion phenomenon  | <b>07</b>    |
| <b>Q.4</b> | (a) Explain factors which increase NO <sub>x</sub> production in CI engine.  | <b>03</b>    |
|            | (b) With a neat sketch explain the process of turbo charging?  | <b>04</b>    |
|            | (c) Differentiate homogenous combustion and diffusion combustion based on any seven aspects.   | <b>07</b>    |
| <b>OR</b>  |  |              |
| <b>Q.4</b> | (a) Explain the principle of auto ignition combustion in the gasoline engine.  | <b>03</b>    |
|            | (b) What is Turbo Lag in Turbocharging?  | <b>04</b>    |
|            | (c) Explain the effect of fuel injection timing on auto ignition combustion.   | <b>07</b>    |
| <b>Q.5</b> | (a) Give advantage of HCCI engine.   | <b>03</b>    |
|            | (b) Which are the modifications required to change from SI combustion to auto ignition combustion?                                     | <b>04</b>    |
|            | (c) Describe how the selective catalytic reduction (SCR) NO <sub>x</sub> control as an alternative to lean NO <sub>x</sub> traps (LNT) | <b>07</b>    |
| <b>OR</b>  |  |              |
| <b>Q.5</b> | (a) What is Gasoline Direct Injection?   | <b>03</b>    |
|            | (b) Explain EGR with the neat sketch   | <b>04</b>    |
|            | (c) Describe the stages of combustion of HCCI in gasoline engines.   | <b>07</b>    |