

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – SUMMER 2024****Subject Code:3170215****Date:22-05-2024****Subject Name:Advance Combustion Technology of I.C. Engine****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.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Explain the strategies adopted for CI engine downsizing. **03**
 (b) Enlist strategy for emission control in Diesel fueled vehicle. **04**
 (c) Explain the reasons for abnormal combustion with turbocharging in CI engine? **07**

- Q.2** (a) What is stratified charge operation in case of gasoline direct injection? **03**
 (b) What is lean boost direct injection (LB DI) concept? **04**
 (c) Explain the merit of combining direct injection and Turbocharging in SI Engine. **07**

OR

- (c) What are the types of nozzles used in gasoline direct injection? Also explain their constructional features with advantage. **07**

- Q.3** (a) Differentiate Turbo charging and Supercharging. **03**
 (b) Explain the principle of auto ignition. **04**
 (c) Explain to differentiate between homogenous combustion and diffusion combustion based on different seven aspects. **07**

OR

- Q.3** (a) Draw and explain the exhaust gas treatment with schematic diagram of SCR. **03**
 (b) Explain different stages of delay period of combustion in CI engine. **04**
 (c) What and how the advantages of combining direct injection and turbo charging in SI engine is achieved? **07**

- Q.4** (a) Explain Lean NO_x trap. **03**
 (b) What is internal exhaust gas recirculation system and external exhaust gas recirculation system? **04**
 (c) Explain with pressure-theta diagram the combustion stages in SI engine. **07**

OR

- Q.4** (a) Write the advantages of gasoline direct injection in terms of efficiency in a real engine. **03**
 (b) Explain EGR with the neat sketch. **04**
 (c) Explain the salient features of the first-generation and the second-generation gasoline direct injection engines **07**

- Q.5** (a) What is supercharging? **03**
 (b) Describe the fundamental principle of HCCI. **04**
 (c) Explain stages of combustion of HCCI engine. **07**

OR

- Q.5** (a) Compare multi point fuel injection and gasoline direct injection system. **03**
(b) What is Turbo Lag in Turbocharging? **04**
(c) Describe the exhaust emission control methodology adopted for BS-VI diesel vehicle. **07**
