

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII (NEW) EXAMINATION – WINTER 2022****Subject Code:2180215****Date:14-12-2022****Subject Name:Automotive and Combustion Engine Technology****Time:10:30 AM TO 01:00 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 tail pipe emission formed by combustion of gasoline in brief. **03**
(b) Enlist advance technologies employed in gasoline engine to enhance fuel economy. **04**
(c) Explain concept and working of direct injection gasoline engine with neat **07**

- Q.2** (a) What do you mean by turbo lag? Explain in brief. **03**
(b) Explain in brief concept of Lean NO_x trap. **04**
(c) Explain concept and technology variable valve timing (VVT) in details. Also give advantages of it. **07**

OR

- (c) Explain urea-based SCR NO_x after treatment strategy to control NO_x. **07**

- Q.3** (a) Define delay period in brief. **03**
(b) What is stratified charge operation in case of gasoline direct injection? **04**
(c) Describe stages of combustion of CI engine with pressure-theta (crank angle) diagram. **07**

OR

- Q.3** (a) Differentiate between internal exhaust gas recirculation system and external exhaust gas recirculation system. **03**
(b) Explain NO_x formation mechanism. **04**
(c) Explain the reasons for knocking and abnormal combustion with turbocharging in SI engine? **07**

- Q.4** (a) Explain in brief concept of lean boost (LB DI) combustion system. **03**
(b) Describe the need of a cam profile switching (CPS) mechanism in conjunction with twin independent variable cam timing (VCT) devices in SI and controlled auto ignition operation in a gasoline engine. **04**
(c) Explain principle of auto ignition combustion in gasoline engine. **07**

OR

- Q.4** (a) Enlist the limitation of HCCI combustion **03**
(b) Explain implications of fuel injection timing on combustion. **04**
(c) Describe problems associated with turbo-charging the SI engine. **07**

- Q.5** (a) Explain in brief implications of EGR on exhaust emission of gasoline engine. **03**
(b) Explain operation of gasoline auto ignition combustion with thermal management. **04**
(c) What are the advantages of combining direct injection and turbo charging in Spark-ignition engine. **07**

OR

- Q.5** (a) Write disadvantages of super-charging. **03**
(b) Differentiate between carburation, MPFI and GDI technologies. **04**
(c) Explain concept of downsizing with one illustration. **07**
