

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BACHELOR OF ENGINEERING – SEMESTER 4 – EXAMINATION – SUMMER 2026**

Subject Code: BE04002011

Date: 02/06/2026

Subject Name: Automobile Engines

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) Define bore, stroke, and compression ratio with significance. **03**  
(b) Define indicated power, brake power, and friction power with relation. **04**  
(c) Compare 2-stroke and 4-stroke engines with suitable diagrams and applications. **07**
- Q.2** (a) Explain working principle of a carburetor using venturi effect **03**  
(b) Differentiate between air injection and solid injection systems. **04**  
(c) Discuss various carburetor circuits and their role under different engine conditions. **07**
- OR
- Q.2** (c) Discuss different types of injector nozzles and analyze their applications. **07**
- Q.3** (a) Explain need of cooling system in I.C. engines. **03**  
(b) Explain functions of lubrication system in engine **04**  
(c) Discuss water cooling system with thermostat valve and its working. **07**
- OR
- Q.3** (a) Explain knocking phenomenon in SI engines and its effects. **03**  
(b) Differentiate between normal and abnormal combustion. **04**  
(c) Explain stages of combustion in SI engine with P-θ diagram. **07**
- Q.4** (a) Discuss purpose of Morse test in multi-cylinder engines **03**  
(b) Explain different engine efficiencies briefly. **04**  
(c) Explain heat balance sheet and its preparation for IC engine **07**
- OR
- Q.4** (a) Explain the need of engine testing. **03**  
(b) List common engine performance parameters and explain any two. **04**  
(c) Analyze various factors affecting engine performance. **07**
- Q.5** (a) Discuss limitations of turbocharging. **03**  
(b) Explain concept of supercharging and its necessity **04**  
(c) Explain turbocharging system with neat sketch and working. **07**
- OR
- Q.5** (a) Explain short-circuiting in scavenging and its effects. **03**

- (b)** Explain the effect of air-fuel ratio on engine efficiency and emissions **04**
- (c)** Discuss how emission norms influence engine design and performance optimization techniques. **07**

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