

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2023****Subject Code:2161902****Date:06-07-2023****Subject Name:Internal Combustion 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) Compare Otto, Diesel and Dual cycle for the Same maximum pressure and heat input. **03**
(b) Comparison between SI and CI Engine **04**
(c) Explain Simple carburetor with neat sketch. Also write down its drawbacks. **07**
- Q.2** (a) Explain with the help of neat sketch, the working of a 2-stroke petrol engine **03**
(b) Draw valve timing diagram for two stroke petrol engine **04**
(c) Explain construction and working of Bomb calorimeter with neat sketch **07**
- OR**
- (c) Explain construction and working of Junker's gas calorimeter with neat sketch. **07**
- Q.3** (a) Differentiate between supercharging and turbocharging. **03**
(b) Explain detonation or knocking in S.I. engine. **04**
(c) A S.I. engine working on Otto cycle takes the air at 0.97 bar and 40 °C. The compression ratio is 7. The net heat supplied is 1.2 MJ/kg of working fluid. Calculate 1) Air standard efficiency 2) Maximum temperature attained in cycle 3) work done per kg of working fluid. Assume $\gamma = 1.4$, $C_v = 720 \text{ J/kg K}$ **07**
- OR**
- Q.3** (a) Explain Willan's Line Method with graph. **03**
(b) A 4 cylinder 4 stroke petrol engine having bore 7.5 cm and stroke 9 cm develops 21 k W. A Morse test was carried out at constant speed of 3000 RPM and brake power is measured when each cylinder was cutoff are 14.8, 14.5, 14.6 and 14.75 kW respectively. Calculate Mechanical efficiency, and brake mean effective pressure. **04**
(c) Explain stages of combustion in C.I. engines. **07**
- Q.4** (a) Comparison between liquid and air cooling systems for engine **03**
(b) Draw a neat diagram of thermostatic controlled water cooling system and explain its working **04**
(c) Explain MPFI system with diagram **07**
- OR**
- Q.4** (a) Write down Important qualities of IC engine fuels **03**
(b) Differentiate between splash and pressure lubrication system. **04**
(c) With neat sketch explain construction and working of Solex carburetor. **07**
- Q.5** (a) What is the need for supercharging? Only write down various applications. **03**
(b) Discuss a "Heat balance sheet" **04**
(c) Explain with neat sketch battery ignition system **07**
- OR**
- Q.5** (a) List the desired properties of a coolant. **03**
(b) Write short note on Bharat Stages of emission norms. **04**
(c) Explain with neat sketch Magneto ignition system **07**
