| Reg. No. | | | | | | | | | | |
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# MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

*(A constituent unit of MAHE, Manipal)*

## VII SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)

## END SEMESTER EXAMINATIONS, NOV/DEC 2018

## SUBJECT: AUTOMOTIVE POLLUTION CONTROL AND ALTERNATIVE FUELS [AAE 4152]

**REVISED CREDIT SYSTEM**
**(27/12/2018)**

Time: 3 Hours MAX. MARKS: 50

**Instructions to Candidates:**

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

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| **1A.** | What are the sources of air pollution from an uncontrolled petrol car? | **(04)** |
| **1B.** | Define blow- by losses from the engines. What technique is adapted in modern engines to minimize such losses? Illustrate with a neat sketch. | **(04)** |
| **1C.** | Define the following(i) Rumble (ii) Ping (iii) Diesel index (iv) Performance number | **(02)** |
| **2A.** | What are the effects of the following operating variables on HC emissions? Justify your answer (i) Load (ii) Speed (iii) Spark timing (iv) Exhaust back pressure | **(04)** |
| **2B.** | Explain the principle of working of catalytic converters with reactions taking place during conversion. | **(04)** |
| **2C.** | Discuss the working principle of diverter valve used in air injection systems? | **(02)** |
| **3A.** | Illustrate how the smoke intensity is measured using Hartridge smoke meters. | **(03)** |
| **3B.** | What are particle traps? List any four active methods of their regeneration. | **(04)** |
| **3C.** | Draw a Temperature- evaporation plot for Compression Ignition engine fuels and discuss ideal properties required in such fuels. | **(03)** |
| **4A.** | Explain Non-Dispersive Infra-Red (NDIR) spectroscopy to quantify the CO and $CO_2$ from the emission test samples. | **(04)** |
| **4B.** | Explain the constructional details and working principle of Toyota lean burn engine. | **(03)** |
| **4C.** | Discuss any two methods of production of Hydrogen. What are its advantages as an s I engine fuel? | **(03)** |
| **5A.** | Octane is burned with 135% theoretical air in an automotive engine. Write the combustion equations and determine the Equivalence ratio. | **(03)** |
| **5B.** | Explain the mechanism of smog formation. Write the series of chemical reactions that leads to smog formation. | **(04)** |
| **5C.** | What are the advantages of using Liquified Petroleum Gas as fuel in Automotive engines? | **(03)** |