| Reg. No. | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

# MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

*(A constituent unit of MAHE, Manipal)*

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

## END SEM EXAMINATIONS, NOV 2019

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

**REVISED CREDIT SYSTEM**
**(21/11/2019)**

Time: 3 Hours MAX. MARKS: 50

**Instructions to Candidates:**

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

| | | |
|---|---|---|
| **1A.** | Explain the effects of vehicle exhaust generated by burning of gasoline and diesel fuels on human life. | **(02)** |
| **1B.** | Discuss the need for automotive emission testing and control. Enlist Bharath Stages recommended in India with its year of inception. | **(03)** |
| **1C.** | Explain the effects of the following engine operating parameters on the formation of hydro carbons, carbon monoxide: i) air fuel ratio ii) engine speed iii) intake manifold pressure iv) valve overlap v) spark timing. | **(05)** |
| **2A.** | Explain the two methods of bio diesel production (i) Pyrolysis (ii) micro-emulsification. | **(02)** |
| **2B.** | What is the necessity for defining fuel requirement in engine? Explain the following requirements w.r.t SI engine: i) Gasoline Anti-knock Properties ii) Volatility iii) Density. | **(03)** |
| **2C.** | What are the types of smoke observed in diesel engine? Explain in detail any SIX factors causing smoke formation in diesel engines. | **(05)** |
| **3A.** | Write short notes on Super Critical Transesterification process. | **(02)** |
| **3B.** | What is meant by detonation in SI engines? Discuss FOUR harmful cause and effects of detonation in SI engines. | **(04)** |
| **3C.** | List and explain the significance of two basic charge modes in Gasoline Direct Injection (GDI) engines. Illustrate with neat sketch difference between spray guided and air guided combustion system in GDI engines. Why the GDI engine is called lean burn engine? | **(04)** |

| | | |
|---|---|---|
| **4A.** | Explain the effect of ethyl alcohol and its positive influence on SI engine performance and how it increases the compression ratio w r t ethanol as alternative fuel. | **(02)** |
| **4B.** | Explain with neat block diagram constructional & functional details of Chemiluminescence NOx analyzer. | **(04)** |
| **4C.** | What is the need for fuel cell technology? Sketch and explain constructional and operational details of alkaline fuel cell, its advantages, disadvantages and applications. | **(04)** |
| **5A.** | What is the working principle of solar cell? How sunlight is converted into electricity? | **(02)** |
| **5B.** | Explain with the aid of neat sketch updraft type gasifier with its principle. Name different working zones of updraft gasifier. | **(03)** |
| **5C.** | Explain principle, construction and working of thermoelectric power generator. Discuss the advantages, disadvantages and application of this technology. | **(05)** |