Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VII SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)

END SEMESTER EXAMINATIONS, DECEMBER 2020

SUBJECT: AUTOMOTIVE POLLUTION CONTROL AND ALTERNATIVE FUELS

[AAE4152]

REVISED CREDIT SYSTEM

(--/--/2021)

Duration: 3 Hours Max. Marks: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.
- Draw sketches in **PENCIL** only

1A) What is Smoke Meter? Explain with neat sketch Obscuration method of smoke measurement. **(02)**

1B) What are the feature of alkaline catalyzed transesterification and lipase catalyzed transesterification methods? **(03)**

1C) What is the need for pollutant measuring instruments? Identify an instrument to measure hydrocarbon pollutant. What is the working principle and operational details of the instrument? **(03)**

1D) Write short notes on fixed dome type bio gas plant. **(02)**

2A) Why charge stratification is recommended? What are the potential advantages of charge stratification? **(02)**

2B) What are the effects of following operating variables on the formation of unburned hydrocarbons (i) Air fuel ratio (ii) Engine speed (iii) Valve overlap **(03)**

2C) Explain how white smoke, blue smoke and black smoke forms in diesel engine. **(03)**

2D) Explain the cause and effect of the following pollutants from automotive; (i) Unburnt hydrocarbon (ii) Carbon monoxide **(02)**

3A) Explain with neat sketch phenomenon of Peltier effect. Do you recommend this principle / effect in Automotive? Justify. **(03)**

3B) Explain with neat sketch operational details of Polymer electrolyte membrane fuel cell. What are the features and advantages of this fuel cell? **(05)**

3C) How automotive emission affects global warming? Justify. **(02)**

4A) Explain the following terminologies: (i) Atomization (ii) Vaporization (iii) Mixing (iv) Self-ignition (v) Combustion. What is the importance of these terms in the diesel engine? **(04)**

4B) Explain with neat sketch wall controlled and spray controlled method of charge stratification and combustion. **(03)**

4C) Explain the operational details and important features of three-way catalytic converter system. What are the advantages of this system? **(03)**

5A) Define knocking. Explain the cause and effects of knocking. **(03)**

5B) Explain with neat sketch operational features of various zones of down draft gasifier. **(05)**

5C) Explain with a valid reason, the effect of blending of hydrogen gas with gasoline fuel on the formation of CO, when high speed SI engine is running at idle condition. **(02)**