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

(26/12/2020)

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) Differentiate between the following pollutants (in tabular form) **(02)**

i) Hydrocarbon and Carbon monoxide

ii) Oxides of Nitrogen

1B) Why the transesterification process is recommended? What are the different methods of production of bio diesel? Explain any one method of transesterification process. **(03)**

1C) What is the necessity for pollutant measuring instruments? Explain with neat sketch constructional & operational details of Non-dispersive infrared (NDIR) absorption type analyzer. **(03)**

1D) Explain with features effective utilization of ethanol as biofuel in engine. Which petroleum fuel you recommend to blend with ethanol. **(02)**

2A) What is the need for Common rail direct injection system in modern engine? What are the advantages of CRDI? **(02)**

2B) What are the effects of following operating variables on the formation of oxides of nitrogen in SI engine: (i) Spark timing (ii) Manifold pressure (iii) Humidity **(03)**

2C) List the types of smoke observed in diesel engine. Explain any three factors, which contributes in the process of smoke formation. **(03)**

2D) Define air pollution. What are the major sources of pollutants from gasoline engine? **(02)**

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

3B) Explain with neat sketch operational and constructional details of Phosphoric acid fuel cells. Write its advantages and disadvantages. **(05)**

3C) Explain with a valid reason, the effect of varying compression ratio and blending of bio ethanol on the formation of Carbon Monoxide. **(02)**

4A) Explain Wall quenching and Incomplete combustion of charge phenomenon. What are the factors that promote incomplete combustion? **(04)**

4B) Differentiate homogenous lean operation and stratified charge operation in tabular form. **(03)**

4C) Explain the operational details and important features of Exhaust Gas Recirculation system. What are the advantages of this system? **(03)**

5A) Explain with a neat sketch cause and effects of over mixing phenomenon in diesel engine. **(03)**

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

5C) What are the important factors due to which hydrogen gas is recommend as blending fuel in SI engine? Why hydrogen gas is not recommended in CI engine? **(02)**