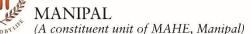
MANIPAL INSTITUTE OF TECHNOLOGY

Reg. No.



VII SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)

ONLINE EXAMINATIONS, JAN-FEB 2021

SUBJECT: AUTOMOTIVE POLLUTION CONTROL AND ALTERNATIVE FUELS

[AAE4152]

REVISED CREDIT SYSTEM

(27/01/2021)

Duration: 3 Hours

Max. Marks: 50

(02)

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 (02) measurement.
- **1B)** What are the feature of alkaline catalyzed transesterification and lipase catalyzed **(03)** transesterification methods?
- **1C)** What is the need for pollutant measuring instruments? Identify an instrument to measure **(03)** hydrocarbon pollutant. What is the working principle and operational details of the instrument?
- **1D)** Write short notes on fixed dome type bio gas plant.
- **2A)** Why charge stratification is recommended? What are the potential advantages of charge **(02)** stratification?
- **2B)** What are the effects of following operating variables on the formation of unburned **(03)** hydrocarbons (i) Air fuel ratio (ii) Engine speed (iii) Valve overlap
- **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 **(02)** hydrocarbon (ii) Carbon monoxide

- **3A)** Explain with neat sketch phenomenon of Peltier effect. Do you recommend this principle **(03)** / effect in Automotive? Justify.
- **3B)** Explain with neat sketch operational details of Polymer electrolyte membrane fuel cell. **(05)** What are the features and advantages of this fuel cell?
- **3C)** How automotive emission affects global warming? Justify. (02)
- **4A)** Explain the following terminologies: (i) Atomization (ii) Vaporization (iii) Mixing (iv) Self- **(04)** ignition (v) Combustion. What is the importance of these terms in the diesel engine?
- **4B)** Explain with neat sketch wall controlled and spray controlled method of charge **(03)** stratification and combustion.
- **4C)** Explain the operational details and important features of three-way catalytic converter **(03)** system. What are the advantages of this system?
- 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 (02) on the formation of CO, when high speed SI engine is running at idle condition.