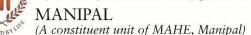
MANIPAL INSTITUTE OF TECHNOLOGY

Reg. No.



## 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

i)

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)
  - Hydrocarbon and Carbon monoxide
  - ii) Oxides of Nitrogen
- **1B)** Why the transesterification process is recommended? What are the different methods **(03)** of production of bio diesel? Explain any one method of transesterification process.
- **1C)** What is the necessity for pollutant measuring instruments? Explain with neat sketch **(03)** constructional & operational details of Non-dispersive infrared (NDIR) absorption type analyzer.
- **1D)** Explain with features effective utilization of ethanol as biofuel in engine. Which **(02)** petroleum fuel you recommend to blend with ethanol.
- 2A) What is the need for Common rail direct injection system in modern engine? What are (02) the advantages of CRDI?
- **2B)** What are the effects of following operating variables on the formation of oxides of **(03)** nitrogen in SI engine: (i) Spark timing (ii) Manifold pressure (iii) Humidity
- **2C)** List the types of smoke observed in diesel engine. Explain any three factors, which **(03)** contributes in the process of smoke formation.
- **2D)** Define air pollution. What are the major sources of pollutants from gasoline engine? **(02)**

(02)

- **3A)** Explain with neat sketch phenomenon of See beck effect. Do you recommend this **(03)** principle / effect in Automotive? Justify.
- **3B)** Explain with neat sketch operational and constructional details of Phosphoric acid fuel **(05)** cells. Write its advantages and disadvantages.
- **3C)** Explain with a valid reason, the effect of varying compression ratio and blending of bio **(02)** ethanol on the formation of Carbon Monoxide.
- **4A)** Explain Wall quenching and Incomplete combustion of charge phenomenon. What are **(04)** the factors that promote incomplete combustion?
- 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 **(03)** system. What are the advantages of this system?
- **5A)** Explain with a neat sketch cause and effects of over mixing phenomenon in diesel **(03)** engine.
- **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 (02) fuel in SI engine? Why hydrogen gas is not recommended in CI engine?