

Exam Date & Time: 12-Dec-2023 (02:30 PM - 05:30 PM)



# MANIPAL ACADEMY OF HIGHER EDUCATION

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING

SEVENTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, NOV/DEC 2023

**Introduction to Alternate Fuels and Applications [MME 4304]**

**Marks: 50**

**Duration: 180 mins.**

**A**

**Answer all the questions.**

Section Duration: 180 mins

Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

- 1) Demonstrate the barriers for implementing alcohols in engines. (4)
  - A)
  - B) Interpret the role of energy security in economic status of a nation. (3)
  - C) Demonstrate how alternate gaseous fuels are better than liquid fuels. (3)
- 2) Articulate the role of alcohols in exhaust gas emission reduction in SI engines. (4)
  - A)
  - B) Demonstrate the benefits of blending of alternate liquid fuels in case of SI engines. (3)
  - C) Compare the performance and emission characteristics of ethanol -gasoline blends operation with neat gasoline operation in SI engines. (3)
- 3) Analyze the role of emulsion of liquid alternate fuels in performance and emissions of CI engines. (4)
  - A)
  - B) Demonstrate the role of transesterification in CI engine liquid fuel utilization. (3)
  - C) Use suitable techniques to use liquid alternate fuels in CI engines. (3)
- 4) Demonstrate the importance of producer gas from an Indian perspective. (4)
  - A)
  - B) Analyze the role of hydrogen as a fuel in SI engine. (3)
  - C) Apply suitable technique to use gaseous fuels in CI engines. (3)

- 5) Differentiate the construction series and parallel of hybrid vehicles. (4)
- A)
- B) Sketch the different layout of hybrid electric vehicles. (3)
- C) Illustrate the benefits of fuel cells in hybrid electric vehicles. (3)

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