VIT
Vellore Institute of Technology

Final Assessment Test – November 2019

Course: MEE1012 - Alternative Fuels
Class NBR(s): 1113 / 1252 / 2172 Slot: F2+TF2
Time: Three Hours Max. Marks: 100

KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION, IS EXAM MALPRACTICE

General Instruction:
Give sketches wherever needed to enhance presentation, whether specifically asked or not.

PART – A (1 X 16 = 16 Marks)
Answer the Question

1. What is alternative fuel? From the data of Petroleum Resource Management System (PRMS) and Indian Strategic Petroleum Reserves Limited (ISPRL), Explain in detail about the petroleum resource and reserves in India with neat sketches.

PART – B (7 X 12 = 84 Marks)
Answer any SEVEN Questions

2. Elaborate the various ways for the production and transportation of liquid hydrogen and also find out the problems of using Hydrogen in SI and CI engines.

3. How the performance and emission characteristics vary when compressed natural gas (CNG) is used as alternative fuel in IC (SI and CI) engines? Design a CI engine using modern technology CNG with neat sketch and also write its advantages and limitations.

4. Differentiate between the biogas and producer gas? What are the factors affecting the biogas generation? Briefly explain about the conventional biogas plants in India with neat sketches.

5. Which alternative fuel is blended with diesel in India and what is the current blend percentage? Explain the production techniques of this fuel.

6. The following readings are taken during the test on a single cylinder SI engine, working on the 4-s cycle and fitted with a rope brake. Effective diameter of brake wheel is 630 mm, Dead load on brake is 200 N, Spring balance reading is 30 N, Speed is 450 rpm, Area of indicator diagram is 420 mm^2, Length of indicator diagram is 60 mm, spring scale is 1.1 bar per mm, diameter of cylinder is 100 mm, stroke is 150 mm, quantity of fuel used is 0.815 kg/h, Calorific value of fuel is 42000 KJ/kg. Calculate the Brake power, Indicated power, mechanical efficiency, Indicated thermal efficiency, Brake thermal efficiency and Brake specific fuel consumption.

7. Briefly explain about the technology used to convert plastic to alternative fuel.

8. Define the term biomass. Briefly explain about the various methods available for biomass to energy conversion.

9. Explain the working principle and characteristics of Fuel cell. Briefly explain about all primary types of fuel cells.