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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Eighth Semester, B.E. – Automobile Engineering

Semester End Examination; June -2016

Alternative Energy Sources for Automobiles

Time: 3 hrs

Max. Marks: 100

Note: Answer any FIVE full questions, selecting at least TWO full questions from each part.

PART - A

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| 1 a. | Classify the alternative fuels and drive trains. | 4 |
| | b. Explain in brief third party inspection for alternative fuel vehicles. | 8 |
| | c. What are the barriers in implementing the alternative fuels? Explain in brief. | 8 |
| 2 a. | Define the various geometrical parameters involved in solar radiation. | 8 |
| | b. Discuss the different types of solar collection devices. Explain the various components of Flat-Plate collector and functions of each with neat sketch. | 8 |
| | c. Enumerate the different main applications of solar energy. | 4 |
| 3 a. | Explain with neat sketch the working of a wind energy conversion system (WECS) with main components. | 10 |
| | b. Describe the main considerations in selecting site for wind generators. | 5 |
| | c. Briefly explain the principle of wind energy conversion. | 5 |
| 4 a. | What is electrolysis? List the various methods of production of hydrogen. Describe any one method of hydrogen production in detail. | 8 |
| | b. What are the different methods for storage of hydrogen? Explain any two of them. | 8 |
| | c. What are the advantages and disadvantages of using natural gas and LPG as fuel in IC engines? | 4 |

PART - B

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| 5 a. | List out the factors affecting the bio-gas generation. Explain in brief different classification of biogas plants. | 8 |
| | b. Explain in brief the steps involved in a dry milling process used for Ethanol production with neat flow chart. | 8 |
| | c. List out the advantages and disadvantages of Butanol and Biodiesel. | 4 |
| 6 a. | Discuss the advantages and disadvantages of Hythane and HCNG. | 4 |
| | b. Explain in brief production of Di-Methyl Ether (DME) from Methanol with neat sketch. | 6 |
| | c. Explain the advantages and disadvantages of the following : | 10 |
| | (i) BTL (Biomass to Liquid) (ii) GTL (Gas to Liquid) (iii) CTL (Coal to Liquid). | |

- 7 a. Write a short on emissions from emulsified fuels and effect of emulsified fuels on diesel after treatment. 6
- b. Explain the water fuel cell with the help of neat sketch and its circuit diagram. Mention the advantages of hydrogen boosters. 8
- c. Explain fuel efficiency improvement for Air engine. 6
- 8 a. With a neat block diagram of an EV system. Explain in brief components of an Electric vehicle. 8
- b. What do you mean by alternative power trains? Explain in brief specific test applicable to EVs as per Automotive Industry standards to evaluate their performance. 6
- c. Describe the conversion of a CI engine to a dual fuel engine and mention the advantages and disadvantages of dual fuel technology. 6

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