



**MAULANA ABUL KALAM AZAD UNIVERSITY OF
TECHNOLOGY, WEST BENGAL**

Paper Code : AUE-803A

ALTERNATE FUELS AND ENERGY SYSTEM

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own
words as far as practicable.*

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following :

10 × 1 = 10

i) Disadvantage of hydrogen as a fuel in IC engine is

- a) storage is easy
- b) low NO_x emission
- c) detonating tendency
- d) easy handling.

ii) Which is the basic fuel for a fuel Cell ?

- a) Hydrogen
- b) Methanol
- c) Electricity
- d) Gasoline.

iii) Which of the following cannot be used as a source for the production of hydrogen ?

- a) Gasoline
- b) Methanol
- c) Carbon dioxide
- d) Natural gas.

iv) Anti-knock characteristics of alcohol when compared to gasoline is

- a) higher
- b) lower
- c) equal
- d) none of these.

v) Biogas consist mainly of

- a) methane and carbon dioxide
- b) propane and butane
- c) ethane and carbon dioxide
- d) none of these.

vi) Relative density (air = 1) of LPG over CNG is

- a) higher
- b) lower
- c) equal
- d) difficult to predict.

vii) Calorific value of CNG compared to LPG is

- a) higher
- b) lower
- c) equal
- d) none of these.

viii) For high octane number of a fuel, flame speed is

- a) higher
- b) lower
- c) equal
- d) none of these.

ix) Viscosity of raw Jatropha oil in centistokes unit is

- a) 4.2
- b) 14.2
- c) 38
- d) 3.8.

x) Alcohol alone cannot be used in CI engine as

- a) Its self ignition temperature is high
- b) latent heat of vaporization is low
- c) both (a) and (b)
- d) none of these.

GROUP - B**(Short Answer Type Questions)**Answer any *three* of the following. $3 \times 5 = 15$

2. Compare LPG and Petrol as an SI engine fuel.
3. What are the differences between P-type and N-type semiconductors ?
4. What are the advantages of CNG as an SI engine fuel ?
5. Write the disadvantages of fuel cell.
6. What are the disadvantages of methanol as an SI engine fuel ?

GROUP - C**(Long Answer Type Questions)**Answer any *three* of the following. $3 \times 15 = 45$

7. a) Explain the working principle of fuel cell. 5
- b) What is the difference between fuel cell and batteries ? 5
- c) Write down the application of fuel cell and types of fuel cell. 5
8. a) What is Bio-diesel ? 3
- b) Compare the various properties of Diesel, raw Jatropha and Bio-diesel. 5

- c) What are the advantages and disadvantages of bio-diesel ? 7
9. a) Discuss alcohol as a SI and CI engine fuels. 8
- b) Compare the properties of gasoline, methanol and ethanol. 7
10. a) Describe how sunlight is converted into electricity in a solar cell. 5
- b) Explain the working principle of solar pond. 5
- c) Briefly describe a refrigeration system using solar thermal energy with a neat sketch. 5
11. a) What are the various methods of hydrogen storage ? 3
- b) Hydrogen is a dangerous as well as a safe fuel. Why ? 7
- c) Describe the various methods of using hydrogen in IC engine. 5