

Code No: 07A72401

**R07****Set No. 2**

**IV B.Tech I Semester Examinations, December 2010**  
**ALTERNATIVE ENERGY SOURCES FOR AUTOMOBILES**  
**Automobile Engineering**

**Time: 3 hours****Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. (a) What are the advantages and limitations of using electric cars on automobiles?  
 (b) Why D.C. series motor is preferred on automobiles and describe about starting of motor? [8+8]
2. (a) What is bio gas how it differ from biomass?  
 (b) Explain the process of photosynthesis with the conditions required.  
 (c) Explain with neat sketch construction and working of fixed dome (Janta Model) type biogas plant. [2+6+8]
3. (a) Discuss the need for non-conventional energy sources.  
 (b) what are renewable energy sources? Compare between renewable and conventional energy sources. [8+8]
4. (a) Differentiate between tank type electro lyzer and bi - polar electrolyzer.  
 (b) What are the various modifications to be made in the engine combustion chamber to have perfect combustion of hydrogen fuel? [8+8]
5. (a) Explain the properties of hydrogen and possible areas of use of hydrogen.  
 (b) What is electrolysis? Explain the construction and working of tank type electrolyzer used in the production of hydrogen. [6+10]
6. (a) What are the various methods of charging and mention their advantages and limitations?  
 (b) Differentiate between lead - acid batteries and dry batteries. [8+8]
7. (a) Compare usage of gas turbines with I.C engines and electric motors considering weight, specific fuel consumption, weight per unit power and pollution.  
 (b) Discuss the special characteristics of turbo - jet engine in sports car. [8+8]
8. (a) State the laws of photovoltaics; discuss the operating characteristics of photovoltaic cells.  
 (b) Why orientation is needed in concentrating type collectors? Describe the different methods of sun tracking. [10+6]

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**R07****Set No. 4**

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**Automobile Engineering**

**Time: 3 hours****Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. (a) Describe in brief solar thermal energy storage systems.  
(b) Discuss the different types of solar collection devices. [8+8]
2. (a) Which type of gas turbine is best suited for automobiles and explain about constant volume or explosion type gas turbine?  
(b) Differentiate between const volume and constant pressure type turbines used in practice. [16]
3. Describe the economy, maintenance initial cost and running costs of the electric automobiles. [16]
4. (a) Explain the production of hydrogen through thermal route.  
(b) Explain the different methods of hydrogen storage. [8+8]
5. (a) Compare the floating drum and fixed dome type biogas plants.  
(b) Explain the factors affecting bio gas generation. [8+8]
6. (a) Compare the cost of fuel consumed in IC engines with that of electrical energy spent and the load, speed characteristics of the above energies.  
(b) How frequently the batteries are to be re - charged ? Make a qualitative analysis and the capacity of the batteries to be selected for a particular automobile. [8+8]
7. (a) Explain the energy scenario in India with illustrations.  
(b) What is the prospect of renewable energy sources in India? [8+8]
8. (a) Why the adjustment of air - to- fuel ratio using hydrogen is less critical than in a gasoline engine ?  
(b) Describe the method of production of hydrogen by steam reformation or partial oxidation of hydro- carbons. [8+8]

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**R07**

**Set No. 1**

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**Automobile Engineering**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions**  
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1. Describe with a suitable sketch method of producing hydrogen by electrolysis of water. [16]
2. (a) Differentiate between open cycle and closed cycle gas turbine.  
(b) Sketch and explain the working of open - cycle gas turbine with heat exchanger. [8+8]
3. (a) Describe the drive arrangement from motor to the gear box and to the differential and arrangement without gear box.  
(b) What are the advantages and disadvantages of gearless drive on electric cars. [8+8]
4. (a) How the batteries are rated ?  
(b) Describe the sequence of operations involved for battery charging. [8+8]
5. (a) Compare between the flat plate collectors and concentrating collectors.  
(b) Classify the method of solar energy storage. Explain the thermo-chemical energy storage. [8+8]
6. (a) What are the advantages and limitations of non-conventional energy sources?  
(b) Explain in brief the renewable energy sources with reference to Indian context? [8+8]
7. (a) What is meant by anaerobic digestion? What are the factors which affect biodigestion? Explain briefly.  
(b) Explain the techniques suggested for maintaining the production of biogas. [8+8]
8. (a) Write a note on production of hydrogen by solar energy method.  
(b) Explain the different methods used for transportation of hydrogen. [8+8]

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**R07****Set No. 3**

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**Automobile Engineering**

**Time: 3 hours****Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. (a) How are biogas plants are classified? Explain briefly.  
 (b) Give an account of:
  - i. Bio gas as engine fuel and
  - ii. Biogas plant problems. [8+8]
2. What are the various factors to be considered in the design of electric automobiles and mention its advantages and limitations ? [16]
3. (a) Discuss the merits and demerits of hydrogen energy as a alternate fuel for automobiles.  
 (b) Discuss the following: Metal hydrides and Hydrogen transportation. [6+10]
4. (a) Explain the different parameters affecting the performance of flat plate collector.  
 (b) Enumerate the different types of concentrating collectors. Explain with neat sketch working of parabolic trough collector. [8+8]
5. (a) Explain the trends and vehicle design for electric cars and mention about the weight and economy.  
 (b) How electric vehicle is only the answer to oil scarcity in future? [8+8]
6. (a) What are the major components of gas turbine used on automobiles and explain about compressor and regenerator ?  
 (b) What type of compressor is best suited for gas turbine used on automobiles ? [8+8]
7. What are the various thermo chemical cyclic processes used for the production of hydrogen and explain about westinghouse electro chemical thermal sulphur cycle process? [16]
8. (a) Compare the following:
  - i. Conventional energy and non conventional energy.
  - ii. Energy science and energy technology.
 (b) Discuss the merits and demerits of the following non-conventional energy sources:
  - i. Solar.
  - ii. Bio fuels. [8+8]

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