

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SIXTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code: AU362
Course Name: HYBRID AND FUEL CELL VEHICLES

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks.

Marks

- | | | |
|---|---|------|
| 1 | a) What is traction? How traction is achieved in Hybrid Electric vehicles? | (5) |
| | b) What are the advantages and disadvantages of hybrid electric vehicle? | (5) |
| 2 | Explain the power flow and control modes of series hybrid electric vehicles with the help of suitable sketches. | (10) |
| 3 | With the help of a neat sketch, explain the construction, working and application of Brushless DC motor. | (10) |
| 4 | a) Briefly explain how BLDC motors are controlled? | (5) |
| | b) Describe the configuration of PMDC Motor with suitable sketch. | (5) |

PART B

Answer any three full questions, each carries 10 marks.

- | | | |
|---|---|------|
| 5 | a) What are the requirements for energy storage systems in HEV and pure electric vehicle? | (5) |
| | b) Describe the analysis of a fuel cell based energy storage device. | (5) |
| 6 | Explain fuel cell based energy storage and its analysis | (10) |
| 7 | Explain different types of batteries which can be used as energy storage device in a Hybrid electric vehicle. | (10) |
| 8 | Design a hybrid electric vehicle including the selection of batteries and electric motor (EM) with Parallel hybrid as base /core. | (10) |

PART C

Answer any four full questions, each carries 10 marks.

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|----|--|------|
| 9 | a) Explain the operating principle of a fuel cell. | (5) |
| | b) List the different types of fuel cell systems available for HEVs. | (5) |
| 10 | Discuss about the construction and working of the following short-term storage | (10) |

systems:

(i) Superconducting magnets (ii) Hydraulic Accumulators

- 11 Explain the construction and working of Molten Carbonate fuel cell (MCFC) (10)
with the help of a suitable sketch
- 12 Explain the construction and working of the following fuel cells: (10)
(i) phosphoric acid fuel cell (ii) Photon exchange membrane fuel cell
- 13 Explain the three modes of operation and working of series hydraulic hybrid (10)
vehicle with the help of a neat sketch.
- 14 With the help of a suitable sketch, explain the construction and working of (10)
Pneumatic hybrid system.

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