Exam.Code:1018
Sub. Code: 35264

2055
M.E. Electrical Engineering (Power System)
Second Semester
EE-8205(b): Hybrid Electrical Vehicles

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt any five questions.

x-x-x

I. Draw and explain the hybrid electric drive train. What is the function of electric motor in drive train? How does HEVs reduce emissions compared to ICE vehicles? (10)

II. How does PEMFC work and why it is commonly used in HEVs? Illustrate with neat and labeled diagram showing the redox and the overall cell reactions. (10)

III. a) Describe Li-ion batteries for HEVs? Illustrate their performance in terms of energy density, cost and thermal performance.
b) What is SOC for batteries in HEVs? (7,3)

IV. a) Explain the role of fuzzy logic or MPC in HEV energy management systems.
b) What sensors are crucial for drive train control in HEVs? (7,3)

V. Give the key differences between AC and DC charging for HEVs? Why DC fast charging is faster than the AC charging? (10)

VI. Discuss the switched reluctance motor (SRM) and how do SRMs perform in regenerative braking compared to PMSM? (10)

VII. Explain the combined charging system? Give differences between CCS type 1 and CCS type 2 connectors? (10)

VIII. Write short notes on:
(a) Sizing of drive system
(b) Integration of EVs in smart grid (2x5)

x-x-x