Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VII SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)

END SEMESTER EXAMINATIONS, DEC-JAN 2018-2019

SUBJECT: ELECTRIC AND HYBRID VEHICLES [AAE 4021]

REVISED CREDIT SYSTEM
(31/12/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A.	Obtain the dynamic equation for calculating tractive effort on wheels.	**(05)**
1B.	Sketch and explain the Power transmission layouts for series parallel hybrid architecture.	**(05)**
2A.	Discuss the method for conducting SoC measurement of a battery.	**(04)**
2B.	Define: a) State of Discharge b) Depth of Discharge	**(03)**
2C.	Draw and explain battery equivalent circuit for Lead Acid battery.	**(03)**
3A.	Discuss the functional characteristics of bidirectional switch.	**(02)**
3B.	Sketch and explain the circuit for full bridge isolated type DC/DC converter.	**(04)**
3C.	Explain the wiring circuit of switched capacitor circuit under active cell balancing method.	**(04)**
4A.	In a reverted epicyclic gear train, the arm A carries two gears B and C and a compound gear D - E. The gear B meshes with gear E and the gear C meshes with gear D. The number of teeth on gears B, C and D are 75, 30 and 90 respectively. Find the speed and direction of gear C when gear B is fixed and the arm A makes 100 r.p.m. clockwise.	**(05)**
4B.	Sketch and explain the block diagram to represent the vehicle simulation.	**(03)**
4C.	Write a note on US06 driving cycle.	**(02)**
5A.	Discuss the modified power follower control strategy in terms of a) candidate operating point, calculating the constituent factors for optimization b) Normalize the constituent factors for each candidate operating point	**(04)**

5B. Discuss the implementation methods for fuzzy logic control strategy **(04)**

5C. List and explain the components of fuzzy logic controller. **(02)**