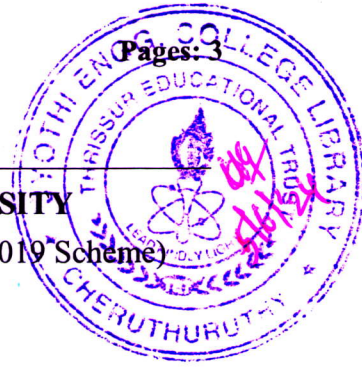


Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
 Eighth Semester B.Tech Degree (R,S) Examination May 2024 (2019 Scheme)



Course Code: EET418

Course Name: ELECTRIC AND HYBRID VEHICLES

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

- | | | |
|----|--|-----|
| 1 | Describe the conceptual advantages of a hybrid electric vehicle over electric vehicles | (3) |
| 2 | Explain the various resistive forces that oppose the motion of a four-wheel vehicle | (3) |
| 3 | The series hybrid drive configuration is used in heavy commercial vehicles whereas small vehicles use parallel configurations justify the statement. | (3) |
| 4 | Draw the block diagram representation of series a hybrid configuration of HEV | (3) |
| 5 | Explain some features of BLDC and PMS motors which make them suitable for EHV application. | (3) |
| 6 | What are the different electrical components of the propulsion system of an EV/EHV? | (3) |
| 7 | Define 'C' rating of a battery. What is its significance? | (3) |
| 8 | What superior characteristics of super capacitor make them suitable for EV application? | (3) |
| 9 | Explain the role of communication network in electric vehicles. | (3) |
| 10 | Enlist the factors which govern the sizing of power electronics for EHV's | (3) |

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

- | | | |
|----|---|------|
| 11 | a) Explain the general electric vehicle configuration with the help of block diagram. | (10) |
|----|---|------|

- b) Explain the ideal torque-speed characteristics required for an electric/hybrid vehicle power plant. (4)

OR

- 12 a) From the fundamental law of motion derive the dynamic equation governing the motion of a four wheeler. (8)
- b) Explain the role of gear system in an ICE with the help of traction curve. (6)

Module II

- 13 a) Draw and explain drive train alternative based on drive train configuration in electric vehicle. (10)
- b) Draw the block diagram representation of parallel a hybrid configuration of HEV (4)

OR

- 14 a) Draw and explain drive train alternative based on power source configuration in electric vehicle (10)
- b) Give the block diagram representation of power flow control in series hybrid electric vehicle. (4)

Module III

- 15 a) With the help of block diagram explain v/f speed control of induction motors used in electric vehicle. (8)
- b) What are the desired features of motors used for electric vehicles? (6)

OR

- 16 a) With the help of necessary circuit diagram explain the forward motoring and forward braking control of a dc motor with a single chopper. (10)
- b) Enlist the merits and demerits of FOC of PMSM for EV applications. (4)

Module IV

- 17 a) Explain the construction, working, advantages and disadvantages of fuel cell as an energy storage device for EV application. (10)
- b) Explain the concept of vehicle to grid power feeding technology. (4)

OR

- 18 a) Explain the different charging algorithms used for charging of EVs. (8)