Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14EE3029** | **Duration :** | **3hrs** |
| **Sub. Name :** | **Electric and Hybrid Vehicles** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | What impact will Electric and Hybrid vehicles make on modern transportation? | CO1 | **10** |
| b. | Discuss the basic parameters for vehicle performance. | CO1 | **10** |
| **(OR)** | | | | |
| 2. | a. | Explain with neat diagram various configurations of Hybrid Electric Vehicle. List down few advantages and disadvantages. | CO1 | **20** |
| 3. | a. | With a block diagram, describe the working of a Fuel Cell Electric Vehicle. Explain the control strategy for FCEV. | CO3 | **20** |
| **(OR)** | | | | |
| 4. | a. | Explain various technologies by which ultrcapacitors are used to store energy in EV and HEV. | CO3 | **10** |
| b. | Discuss the basic parameters for vehicle performance. | CO1 | **10** |
| 5. | a. | Draw and explain the functional block diagram of Electric Propulsion System in electric and hybrid vehicles. | CO2 | **20** |
| **(OR)** | | | | |
| 6. | a. | Design the size of traction motor for an EV with following specificationParameters:Vehicle total mass,M:1500kgRolling resistance coefficient,fr:0.01Aerodynamic drag coefficient,CD:0.4Front area,Af:2.0m2Transmission efficiency(single gear):0.9Speed ratio, x=6Performance specification:Acceleration time (from 0 to 100km/h),ta:10 sMaximum gradeability:>30% at low speed and >5% at 100km/h.Maximum speed: 160km/h Assume air density as 1.202kg/m3 | CO2 | **10** |
| b. | Briefly about the principle and chemical reaction of Lead acid batteries and its use in hybrid vehicles. | CO3 | **10** |
| 7. | a. | Explain with neat diagram, the Parallel Hybrid Brake system in electric and hybrid vehicles with ABS. | CO3 | **20** |
| **(OR)** | | | | |
| 8. | a. | Explain the basic operation of induction motor. Also explain in detail the constant Volt/Hertz control for traction applications. | CO3 | **20** |
|  | | **Compulsory:** |  |  |
| 9. | a. | Describe the operation of Flywheel. Explain the various flywheel technologies that could be used in Electric and Hybrid Vehicles. | CO2 | **20** |

ALL THE BEST