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



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18EE3022** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ELECTRIC AND HYBRID VEHICLES** | **Max. Marks :** | **100** |

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| **Q. No.** |  | **Questions** | **Course Outcome** | **Marks** |
| **ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)** | | | | |
| 1. |  | Classify and compare the various configurations of HEV and discuss the same with neat sketches. | CO1,  CO2 | 16 |
|  |  |  |  |  |
| 2. |  | With a neat sketch, explain the construction and operation of Ultracapacitor used for energy recovery. | CO3 | 16 |
|  |  |  |  |  |
| 3. |  | A low speed EV having a curb weight of 560 Kg and a payload of 360 kg which has a wheel of radius 0.3 mts. The vehicle reaches a maximum speed of 40Km/hr in 6 secs. Let the aerodynamic coefficient be 0.23, air density be 1.3kg/m3, frontal area of 2.2m2. Let the gear ratio of the transmission system be 4.091 and g=9.81m/s2 and fr=0.013. Calculate the total tractive effort required. | CO5 | 16 |
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| 4. |  | Discuss the Torque–slip characteristics of an induction motor with fixed stator frequency and voltage. Also explain the constant V/F control of Induction Motor. | CO5 | 16 |
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| 5. |  | With a detailed block, discuss the performance analysis and control of BLDC Motor based EVs. | CO5 | 16 |
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| 6. |  | With relavent sketch, explain the various functions of Fuel Cell Vehicles. Also discuss its merits and demerits. | CO3 | 16 |
|  |  |  |  |  |
| 7. |  | Write short notes on terms of technical specifications of the following passenger cars available in the market.   1. Mitsubishi MiEV 2. Honda Insight 3. Toyota Prius 4. Chevrolet Volt | CO2 | 16 |
| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8. |  | Give the step by step procedure for Range Estimation of Electric car using MATLAB. | CO6 | 20 |