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

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**End Semester Examination – Nov/Dec – 2018**

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| **Code :** | **14EE2024** | **Duration :** | **3hrs** |
| **Sub. Name :** | **BASICS OF 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. | Outline the history of electric and hybrid vehicle. | CO1 | 15 |
| b. | Compare and Contrast electric vehicle with IC engine vehicles. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Describe the working of battery electric vehicle and hence explain the use of controller. | CO2 | 15 |
| b. | Distinguish between conventional braking system and regenerative braking. | CO3 | 5 |
|  |  |  |  |  |
| 3. | a. | Explain the operation, working of 4 stroke spark ignited IC engine in detail. | CO1 | 15 |
| b. | List the advantages of hybrid vehicles over conventional vehicles. | CO1 | 5 |
| (OR) | | | | |
| 4. | a. | Recall the working of solar powered electric vehicle in detail. | CO1 | 15 |
| b. | Differentiate between onboard and offboard solar vehicles. | CO2 | 5 |
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| 5. | a. | With the help of neat block diagrams, explain the series-parallel and complex configuration of hybrid vehicles. | CO2 | 15 |
| b. | Draw the block diagram of plug-in hybrid vehicle . | CO2 | 5 |
| (OR) | | | | |
| 6. | a. | Discuss in detail about the series hybrid vehicle. Also mention its advantages and limitations. | CO1 | 10 |
| b. | Explain any one method to control the dc motors using choppers. | CO2 | 10 |
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| 7. | a. | Illustrate the principle of operation, construction used in BLDC motors. Compare BLDC with brushed DC motors. | CO2 | 15 |
| b. | A 3Φ, 10 HP induction motor with four number of poles is connected to a 415V, 50Hz supply. The Motor also has an efficiency of 95% and Power factor of 0.86. When the motor is running at its rated speed, calculate:   1. electrical power consumed by the motor. 2. synchronous speed of the motor. | CO2 | 5 |
| (OR) | | | | |
| 8. | a. | Classify the 3 phase induction motor based on rotor construction and explain in detail the working principle. | CO2 | 15 |
| b. | Write the features of super capacitors. | CO3 | 5 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | Explain the significance of lead acid battery in hybrid vehicles and hence mention its working. | CO3 | 15 |
| b. | Enumerate the advantages and limitations of flywheels. | CO3 | 5 |