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

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

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| **Code :** | **17EE3026** | **Duration :** | **3hrs** |
| **Sub. Name :** | **EV ENERGY SOURCES AND ENERGY RECOVERY** | **Max. marks :** | **100** |

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

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| Q. No. | Sub Div. | Questions | Marks |
| 1. | a. | Describe about various battery charging methods in detail. | 10 |
| b. | What are the various methods to estimate the availability of power in a battery? | 10 |
| (OR) | | | |
| 2. | a. | Construct a comparison table to list and characterize different types of batteries. | 12 |
| b. | What is Battery aggregation and how do they perform in electric vehicles. | 8 |
| 3. | a. | Explain in detail the V-I characteristics of a fuel cell. | 10 |
|  | b. | Conclude the salient features of hydrogen storage system. | 10 |
| (OR) | | | |
| 4. | a. | Discuss the various fuel cell techniques available in recent days. | 12 |
|  | b. | Summarize the merits of non hydrogen fuel cells. | 8 |
| 5. | a. | Briefly explain the working of ultra-capacitors and how the power is extracted from it? | 10 |
|  | b. | Develop a Regenerative braking model and list its features. | 10 |
| (OR) | | | |
| 6. | a. | Give a detailed study about braking systems in EVs and HEVs and conclude its recent prospects. | 12 |
|  | b. | Describe about ABS scheme of braking. | 8 |
| 7. | a. | Develop the design aspects involved in ESS. | 10 |
|  | b. | Write the essentials in Cell balancing in a battery system and write its algorithms | 10 |
| (OR) | | | |
| 8. | a. | What are the factors involved in battery management system? Explain in detail. | 10 |
|  | b. | List the safety measures and charge management in EVs. | 10 |
|  | | **Compulsory:** |  |
| 9. | a. | Summarize the necessity of energy storage systems in an electric vehicle. | 10 |
|  | b. | Prepare a comparison chart for various energy storage techniques. | 10 |