**20EE704/JO**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **January, 2024** | **Electrical & Electronics Engineering** | | |
| **Seventh Semester** | **Electric Vehicles** | | |
| **Time:** Three Hours | | **Maximum:** 70 Marks | |
| ***Answer question 1 compulsory.*** | | | **(14X1 = 14Marks)** |
| ***Answer one question from each unit.*** | | | **(4X14=56 Marks)** |
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|  |  |  | CO | BL | M |
| 1 | a) | Define grad angle. | CO1 | L1 | 1M |
|  | b) | What is meant by a electric vehicle? | CO1 | L1 | 1M |
|  | c) | List out the depending parameters of rolling resistance | CO1 | L1 | 1M |
|  | d) | Define the parameter of fuel consumption of the vehicle. | CO1 | L1 | 1M |
|  | e) | What are the advantages of electric traction? | CO2 | L1 | 1M |
|  | f) | Define Plug-In hybrid electric vehicle. | CO2 | L1 | 1M |
|  | g) | What is the basic concept of hybrid traction in vehicles? | CO2 | L1 | 1M |
|  | h) | Mention any two applications of SRM. | CO3 | L1 | 1M |
|  | i) | Classify different type of BLDC motors. | CO3 | L1 | 1M |
|  | j) | Stator supply frequency is 50Hz and it is a motor with 6 stator poles. Find motor speed or rotor speed for 10% slip. | CO3 | L1 | 1M |
|  | k) | What are advantages of indirect FOC over Direct FOC control ? | CO3 | L1 | 1M |
|  | l) | Define conventional capacitor. | CO4 | L1 | 1M |
|  | m) | What do you mean by electrolytic capacitors? | CO4 | L1 | 1M |
|  | n) | Define Gibbs free energy. | CO4 | L1 | 1M |
| **Unit-I** | | | | | |
| 2 | a) | Write Short notes on the history of EV’s. | CO1 | L2 | 7M |
|  | b) | Explain the impact of the Modern EV’s on environment . | CO1 | L2 | 7M |
| **(OR)** | | | | | |
| 3 |  | Develop the mathematical models to determine vehicle performance. | CO1 | L3 | 14M |
| **Unit-II** | | | | | |
| 4 | a) | What hybrid vehicle? How its different from EV’s? | CO2 | L2 | 7M |
|  | b) | Explain various classifications of hybrid electric drive train with neat diagrams. | CO2 | L2 | 7M |
| **(OR)** | | | | | |
| 5 | a) | Explain the power flow in series Hybrid Electric vehicles with neat diagram. | CO2 | L2 | 7M |
|  | b) | Explain the power flow in Parallel Hybrid Electric vehicles with neat diagram. | CO2 | L2 | 7M |
| **Unit-III** | | | | | |
| 6 | a) | Explain the forward motoring and regenerative braking control of a DC motor with a single chopper. Give circuit diagram, and show the quadrants of operation. | CO3 | L2 | 7M |
|  | b) | Explain the basic operating principle of induction motor drive. | CO3 | L2 | 7M |
| **(OR)** | | | | | |
| 7 | a) | What is meant by field orientation control ? | CO3 | L2 | 7M |
|  | b) | Explain the speed control of the BLDC motor with Block diagram. | CO3 | L2 | 7M |
| **Unit-IV** | | | | | |
| 8 | a) | Explain the Basic Lead –Acid battery cell operation with neat sketch. | CO4 | L2 | 7M |
|  | b) | Explain the seven various parameters of batteries used in HEV’s. | CO4 | L2 | 7M |
| **(OR)** | | | | | |
| 9 | a) | Explain how the Fly wheels will helps to working of four stoke IC engine operation. | CO4 | L2 | 7M |
|  | b) | Explain the Alkaline fuel Cell and Photon exchange membrane Fuel Cell. | CO4 | L2 | 7M |

