

**School of University Polytechnic****Diploma in Electrical Engineering  
Semester End Examination - Jun 2024****Duration : 180 Minutes  
Max Marks : 100****Sem IV - N1DJ401B - Electrical Vehicles Controls and Drives**General Instructions*Answer to the specific question asked**Draw neat, labelled diagrams wherever necessary**Approved data hand books are allowed subject to verification by the Invigilator*

- |     |  |        |
|-----|--|--------|
| 1)  | Define induction motor.  | K1(2)  |
| 2)  | Explain the concept of a solid-state controller in electric vehicles.  | K2(4)  |
| 3)  | Explain the process of current control in a voltage source inverter.   | K2(6)  |
| 4)  | What control methods are commonly used in motor controllers for electric vehicles?   | K3(9)  |
| 5)  | Illustrate the role of a freewheeling diode in regenerative braking in DC motor drives.  | K3(9)  |
| 6)  | Examine the importance of torque-speed characteristics in electric vehicle traction motors.  | K5(10) |
| 7)  | Analyze the various drivetrain configurations used in electric vehicles, including their advantages, limitations, and suitability for different applications.  | K4(12) |
| 8)  | Examine the economic implications of electric vehicle adoption, including total cost of ownership, resale value, job creation, supply chain dynamics.  | K5(15) |
| 9)  | Examine the challenges and technological advancements in achieving four-quadrant operation in DC motor drives,   | K5(15) |
| 10) | Discuss the challenges and opportunities associated with integrating hybrid electric drive trains into existing vehicle platforms, including compatibility issues, retrofitting considerations, and technology adoption barriers, and propose strategies for overcoming implementation challenges. | K6(18) |