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**Question Paper Code: U3409**

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2024

Professional Elective

Electrical and Electronics Engineering

**21EEV409 ELECTRIC VEHICLE CHARGING SYSTEMS**

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10 x 2 = 20 Marks)

1. How does pulse charging work? State one advantage. CO1-U
2. What is constant voltage charging in EVs? Give an example. CO1-U
3. Differentiate between AC and DC chargers used in electric vehicles CO1-U
4. What is the primary function of charging control in electric vehicle charging systems? CO1-U
5. What is electromagnetic interference, and how does it relate to electric vehicle charging systems? CO1-U
6. Define coupling in the context of wireless power transfer. CO1-U
7. What is the Qi wireless charging standard used in electric vehicles? CO1-U
8. What role does magnetism play in conductive charger standards for electric vehicles? CO1-U
9. What is the function of load management in electric vehicle charging stations? CO1-U
10. How does a pantograph contribute to electric vehicle charging? CO1-U

PART – B (5 x 16= 80 Marks)

11. (a) Explain principles of constant voltage, constant current, and pulse charging in EV systems. Give real-world examples for each method. CO1-U (16)

Or

- (b) Explain differences between constant voltage and constant current charging in EVs. CO1-U (16)

12. (a) Evaluate charging control methods in EV chargers, including voltage regulation, current regulation, and power factor correction. Assess impact on charging efficiency and battery longevity. CO2-App (16)
- Or
- (b) Compare performance characteristics of semiconductor devices in charger circuits. CO2-App (16)
13. (a) Assess potential electromagnetic interference issues in inductive EV charging. Evaluate strategies for mitigating interference to ensure safe charging. CO4-Ana (16)
- Or
- (b) Compare performance characteristics of semiconductor devices in charger circuits. CO4-Ana (16)
14. (a) Develop proposal for standardized EV charging infrastructure integrating multiple standards. Consider scalability, interoperability, and ease of deployment. CO3-App (16)
- Or
- (b) Develop conceptual design for dynamic wireless charging system for EVs. CO3-App (16)
15. (a) Describe EV charging stations, pantograph systems, load management, and V2G technology. CO1-U (16)
- Or
- (b) Discuss load management in EV charging infrastructure. CO1-U (16)