Name: **Enrolment No:**	

UPES

End Semester Examination, May 2025

Course: Intelligence Communication: EV and Electric Grid **Semester: VIII**

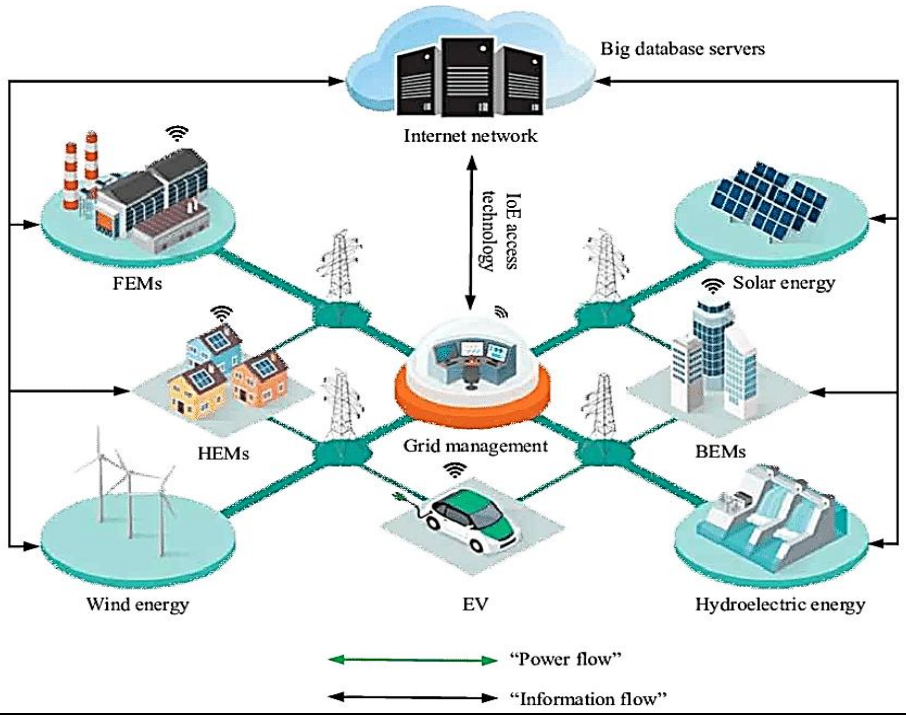
Program: B.Tech (EE) **Time : 03 hrs.**

Course Code: EPEG 4032 **Max. Marks: 100**

Instructions: Read the questions carefully. Assume if any data is missing.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	What are the key advantages of industrial Ethernet over traditional serial fieldbus protocols?	**4**	**CO1**
Q 2	List any four traditional serial fieldbus protocols used in industrial communication and briefly describe their role.	**4**	**CO1**
Q 3	Explain how industrial Ethernet improves connection distance and node connectivity compared to traditional fieldbus protocols.	**4**	**CO2**
Q 4	Discuss the need for a unified hardware and software platform in the context of industrial Ethernet protocols and real-time communication requirements.	**4**	**CO2**
Q 5	Name any four industrial Ethernet protocols and explain the significance of having multiple protocols in industrial communication systems.	**4**	**CO2**
SECTION B **(4Qx10M= 40 Marks)**			
Q 6	Explain the various transmission media used in industrial communication—copper, fiber optics, and wireless. Compare them in terms of performance, reliability, distance, and typical use cases.	**10**	**CO3**
Q 7	Discuss the use of the Ethernet in industrial environments. Include details about Ethernet's operating principles, components (e.g., switches, routers), MAC/IP addressing, and determinism issues.	**10**	**CO3**
Q 8	Explain the structure and components of an industrial automation system with the help of a diagram. Discuss the roles of sensors, actuators, control computers, and communication networks.	**10**	**CO3**

	OR Describe various types of network topologies used in industrial communication. Explain the advantages and disadvantages of at least three topologies with suitable diagrams.		
Q 9	Compare the different fieldbus systems such as PROFIBUS, CAN (Device Net), CC-Link, AS-Interface, and IO-Link in terms of transmission media, topology, number of devices supported, and application areas.	**10**	**CO2**
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	Develop a comprehensive and enhanced charging automation system for electric vehicles (EVs), addressing the following components: a) Implementation of Wired and Wireless Power Transfer b) Charging Automation and Compliance with Standards c) Integration of IoT for Intelligent Charging Management d) Implementation of RFID-based Charging Station Security Provide a detailed discussion on how these technologies can be seamlessly integrated to create a robust, secure, and efficient EV charging ecosystem.	**20**	**CO4**
Q 11	Justify the role of components used for Smart and Sustainable Electric Vehicle Charging Strategy from the model shown below:  	**20**	**CO4**

	OR Do the system planning of grid-connected electric vehicle charging stations and illustrate the key technologies.