| Name:<br><br>Enrolment No: | |
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**UPES**
**End Semester Examination, December 2023**

Course:  Smartgrid & IoT                                              Semester:  V
Program:  B.Tech. Renewable & sustainable energy engineering      Time        : 03 hrs.
Course Code:  EPEG 3066                                          Max. Marks: 100

### SECTION A
### (5Qx4M=20Marks)

| S. No. | | Marks | CO |
|---|---|---|---|
| Q 1 | How does blockchain address issues related to grid stability and power quality in smart grids? | 4 | CO2 |
| Q 2 | Identify one specific benefit of integrating IoT into Smart Grids and briefly describe how it contributes to energy conservation. | 4 | CO1 |
| Q 3 | Recognize one key advantage of using smart meters over traditional utility meters, and how it benefits both consumers and utility providers. | 4 | CO1 |
| Q 4 | Brief how Big Data analytics can benefit Smart Grids in terms of improving energy efficiency. | 4 | CO2 |
| Q 5 | Define Machine-to-Machine (M2M) communication and provide a brief example of its application. | 4 | CO3 |

### SECTION B
### (4Qx10M= 40 Marks)

| | | | |
|---|---|---|---|
| Q 6 | Briefly explain how smart meters differ from traditional utility meters. | 10 | CO2 |
| Q 7 | Differentiate between the responsibilities of the Network layer and the Data Link layer in the OSI model. | 10 | CO3 |
| Q 8 | Provide a comprehensive overview of the three main layers in IoT architecture: Perception, Network, and Application. Discuss the functions of each layer and how they interact to enable IoT functionality.<br>**OR**<br>Substantiate the advantages and challenges of using IPv6 in IoT architecture for addressing and communication? | 10 | CO4 |
| Q 9 | Describe the concept of M2M gateway devices. How do they bridge the gap between M2M devices and the central communication network? | 10 | CO3 |

### SECTION-C
### (2Qx20M=40 Marks)

| | | | |
|---|---|---|---|
| Q 10 | Consider a situation where two devices on a network are having difficulties communicating. Propose a step-by-step approach, involving each OSI layer, to diagnose and resolve the connectivity issue. | 20 | CO3 |

| Q 11 | Discuss the role of smart metering in promoting energy conservation and sustainable practices. Provide examples of how consumers and utility companies benefit from smart meter technology. <br> **OR** <br> Explain the concept of IEC 61850, a standard for substation automation, and its role in substation digitalization. How does it enhance interoperability and communication in substations? | **20** | **CO4** |
| --- | --- | --- | --- |