**(3 Hours)** **[Total Marks: 80]**

N.B.: (1) Question No. 1 is **Compulsory**.
(2) Attempt any **three** questions out of the remaining **five**.
(3) Each question carries 20 marks and sub-question carry equal marks.
(4) Assume suitable data if required.

1. Attempt any **FOUR** of the following (Each question carry 5 Marks)
   (a) Explain the importance and role of sensing and actuation in IoT. **(5)**
   (b) Compare Request-Response, Push-Pull, Publish-Subscribe and Exclusive Pair communication model in IoT. **(5)**
   (c) Discuss physical devices and endpoints in IoT based system with example. **(5)**
   (d) Explain the concept of Piconet in wireless communication. **(5)**
   (e) Differentiate between IoT and Industrial IoT. **(5)**

2. (a) Define IoT. List & Explain Characteristics of IoT. **(10)**
   (b) Draw and explain in detail the functional block diagram of IoT. **(10)**

3. (a) What are the real-world design constraints while designing IoT system. **(10)**
   (b) What is IoT Operating System? Explain in brief various operating systems used in IoT. **(10)**

4. (a) Explain the Zigbee and Z-Wave protocols. Provide examples of real-world applications where each protocol is commonly employed. **(10)**
   (b) List various cloud based IoT platforms and explain any 3 in detail. **(10)**

5 (a) Describe HTTP and MQTT protocol. Explain how MQTT is more suitable for IoT. **(10)**
   (b) Explain any one platform used to develop IoT applications. **(10)**

6 (a) Describe fog computing, illustrate it with a clear diagram. Also identify few industries/applications where fog computing is applied. **(10)**
   (b) Draw and explain system design diagram of a home automation system using IoT to control devices like light, TV, house climate and home appliances. Explain with respect to the software, hardware, sensors, protocols, and platforms used to design this system. **(10)**

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