Time: 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.	(a)	What are the real-world design constrains while designing IoT systems?	(5)
	(b)	Describe the importance and role of sensing and actuation in the context of IoT. Also give example of any two sensors and two electrical actuators.	(5)
	(c)	Why are MAC (Media/Medium Access Control) protocols essential in networking? Name any five MAC protocols.	(5)
	(d)	Write major features of Zigbee. Which topologies are supported by Zigbee?	(5)
	(e)	Compare Arduino and Raspberry Pi platform for IoT development.	(5)
2.	(a)	Define Internet of Things (IoT). List & Explain Characteristics of IoT.	(10)
	(b)	Why privacy and network security is important in IoT based system and applications? Explain various privacy and security measures in IoT based systems.	(10)
3.	(a)	Explain different communication models used in IoT.	(10)
	(b)	What is the role of IoT operating systems in IoT? Briefly describe some of the popular IoT operating systems.	(10)
4.	(a)	Explain Bluetooth BLE. How BLE is different than classical Bluetooth?	(10)
	(b)	List various cloud based IoT platforms. Explain any 3 in detail.	(10)
5.	(a)	Explain the terms: (i). REST (ii). SOAP (iii). WebSocket	(10)
	(b)	Explain protocol stack of mobile app for IoT.	(10)
6.	(a)	How IoT can be employed for eHealth monitoring to continuously track vital signs like heart rate, blood pressure, blood glucose level etc. and trigger automated alerts or actions in case of abnormal readings? Draw system design diagram and explain with respect to sensors, hardware, software, protocols and platforms used to design this system.	(10)
	(b)	Draw system design diagram of IoT based irrigation system and explain its functioning.	(10)

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