

Program: B. Tech.Year: II Semester: IVStream: Computer ScienceSubject: Design and Applications of Internet of ThingsTime: 03 hrs (10.00 am to 1.00 pm)Date: 18 / 04 / 2024

No. of Pages: 2

Marks: 100**Final Examination/Re-Exam 2022-23**

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

- 1) Question No. 1 is compulsory.
- 2) Out of the remaining questions, attempt any 4 questions.
- 3) **In all 5 questions to be attempted.**
- 4) All questions carry equal marks.
- 5) **Answer each new question to be started on a fresh page.**
- 6) **Figures in brackets on the right-hand side indicate full marks.**
- 7) **Assume Suitable data if necessary.**

Q.1			
CO-1 ; SO-6; BL-1	a.	What are the energy harvesting techniques used in IoT applications?	[5]
CO-4 ; SO-2; BL-6	b.	Discuss SPI interfacing used for peripheral interfacing with its advantages.	[5]
CO-2 ; SO-1; BL-1	c.	Recall the challenges faced in the deployment of IoT systems.	[5]
CO-2; SO-6 ; BL-2	d.	Interpret the concept of interfacing ESP 8266 with web services.	[5]
Q.2			
CO-2 ; SO-1; BL-2	a.	Explain the components and communication technologies involved in IoT systems.	[10]
CO-2; SO-6 ; BL-2	b.	Compare Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS) cloud models with advantages and provide examples of IoT applications for each model.	[10]
Q.3			
CO-4 ; SO-2; BL-2	a.	Illustrate differences between analog and digital sensors. Provide two examples of each type and discuss their applications in IoT systems.	[7]

CO-3 ; SO-1; BL-6	b.	Inspect the layers of IoT architecture with the function of each layer.	[7]
CO-2 ; SO-6; BL-2	c.	Elaborate the key features of Raspberry Pi that make it suitable for IoT projects.	[6]
Q.4			
CO-4; SO-2 ; BL-1	a.	Describe the process of interfacing the Soil Moisture sensor with an Arduino board. Provide a systematic explanation of the interfacing process with code extract.	[10]
CO-1 ; SO-6; BL-4	b.	Analyze 6LoWPAN protocol as a power management routing technique in IoT.	[10]
Q.5			
CO-1; SO-3; BL-1	a.	Define the MQTT protocol and explain its components & methods. Discuss its advantages over other protocols.	[10]
CO-1 ; SO-6; BL-2	b.	Demonstrate RFID operation in terms of components, working, applications, and Disadvantages.	[10]
Q.6			
CO-2 ; SO-1; BL-6	a.	Design a Home Intrusion Detection System using IoT and discuss its design principles and benefits in detail.	[10]
CO-4 ; SO-2; BL-3	b.	Classify pressure sensors and explain their applications in detail.	[10]
Q.7			
CO-4 ; SO-2; BL-1	a.	List different types of gas sensors according to what gases they can sense & draw an interfacing diagram for it with an Arduino board.	[7]
CO-2 ; SO-6; BL-1	b.	Summarize the features and functionalities of ThingSpeak API for IoT Enhancement.	[7]
CO-1 ; SO-3; BL-4	c.	Examine S-MAC protocols in terms of their features, advantages, and applications in IoT systems.	[6]