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Reg. No. : | | | | | | | | | | | | |

Question Paper Code: R3I04

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Third Semester

CSE (Internet of things)

R21UIO304- FUNDAMENTALS OF IoT

(Regulations R2021)

Duration: Three hours | Maximum: 100 Marks

Answer All Questions

PART A - (5 x 1 = 5 Marks)

1. What type of transmission is involved in communication between a computer and a keyboard? CO2-App

   a) Half-duplex b) Full-duplex c) Simplex d) Automatic

2. What is the peak downlink data rate offered by LTE Release 8 with 20 MHz bandwidth and 2 × 2 MIMO? CO1-U

   a)150 Mbps b) 100 Mbps c) 250 Mbps d) 200 Mbps

3. IoT devices typically communicate through which of the following methods? CO1-U

   a) Human intervention b) Direct cable connections

   c) Internet protocols d) Sound waves

4. Which project is an early prototype mentioning the WoT concept? CO2-App

   a) Arduino b) Energy Visible project at ETH Zurich

   c) Nimbits d) AgSphere

5. _____is a policy that envisions the regular monitoring of machine and equipment conditions to understand their operating condition. CO1-U

   a) Corrective Maintenance (CM); b) Corrective Maintenance (CM);

   c) Corrective Maintenance (CM); d) Corrective Maintenance (CM);

PART – B (5 x 3= 15 Marks)

6. State differences between M2M and IoT. CO2-App

7.		Assume the maximum length of a message is 26 bytes for both uplink and downlink. If each message takes 2 seconds to transmit, determine the total time spent in transmission per day for both uplink and downlink messages, given that you can send up to 140 messages per day.	CO2-App	
8.		Outline the OIC Core Framework Basic Operation	CO1-U	
9.		Define USN (Ubiquitous Sensor Networks) and list its main components.	CO1-U	
10.		What are Smart Objects in the context of IoT?	CO1-U	

PART – C (5 x 16= 80 Marks)

11.	(a)	Describe the standard components of a typical WSN node and explain their features with neat diagram.	CO1-U	(16)
		Or		
	(b)	What are the various architectural components of 5C architecture in Cyber Physical systems (CPS)	CO1-U	(16)
12.	(a)	Using RFC 7452 as a framework, design IoT communication strategies for a smart agriculture system addressing communication models	CO1-U	(16)
		Or		
	(b)	a. How the ZigBee is used in home automation and medical device data collection b. Sketch the Thread network architecture from end device to cloud	CO1-U	(8+8)
13.	(a)	Explain the Open interconnect consortium core framework and specification features	CO1-U	(16)
		Or		
	(b)	Explain the different processing topologies in IoT and their classifications, with a clear diagram.	CO1-U	(16)
14.	(a)	Describe the standards for SCADA systems and explain the extensions on RFID standards.	CO1-U	(16)
		Or		
	(b)	Explain the components of OSGi architecture with the help of a diagram.	CO1-U	(16)

15. (a) Identify the steps to design a Brownfield IoT solution for a manufacturing plant. Explain how you would retrofit existing machinery with IoT sensors and identify the results in terms of efficiency and cost savings. CO2-App (16)

Or

(b) Propose a solution that uses Hydra middleware to solve a specific industrial problem. Explain how Hydra's features address challenges and predict the performance improvements. CO2-App (16)