Total No. of Questions: 6 *Total No. of Printed Pages:2*

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2022

OE00058 Internet of Things

Programme: B.Tech. Branch/Specialisation: All

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. A Restful web service is a one which is implemented using _____ principles. **1**

(a) Http (b) HTTP & REST

(c) Rest (d) All of these

ii. _____ are software components in IoT device which is used for sensing or controlling attached devices. **1**

(a) Device (b) Controller service

(c) Resource (d) Web Service

iii. M2M systems have _____ machine types within M2M area network. **1**

(a) Homogeneous (b) Hybrid

(c) Heterogeneous (d) None of these

iv. OpenFlow is broadly accepted SDN protocol for _____ interface. **1**

(a) Northbound (b) East-Westbound

(c) Southbound (d) All of these

v. XMPP uses _____. **1**

(a) XML (b) JSON (c) Both (a) & (b) (d) None of these

vi. CRUD operation is indicated by **1**

(a) PUT, POST GET, DELETE

(b) POST, GET,PUT,DELETE

(c) GET,PUT,POST,DELETE

(d) GET,POST,PUT,DELETE

vii. IIoT uses features of _____ and IoT. **1**

(a) Industry 1.0 (b) Industry 3.0

(c) Industry 2.0 (d) Industry 4.0

viii. LED is an _____ which emits light or infrared radiation. **1**

(a) Sensor (b) Actuator (c) Both (a) & (b) (d) None of these

P.T.O.

ix. _____ is the microcontroller used in Arduino Uno. **1**

(a) ATmega328 (b) ATmega16

(c) ATmega2560 (d) AT919AM3x0C

x. _____ instruction set architecture is used in Raspberry Pi. **1**

(a) X86 (b) AVR (c) MSP (d) ARM

Q.2 i. Describe an example of IoT system in which information and knowledge are inferred from data. **2**

ii. Describe an example of IoT service that uses publish/subscribe communication model. **3**

iii. What are the architectural constraints of REST principles? **5**

OR iv. What are various applications of IoT? Elaborate how IoT is helpful in each. **5**

Q.3 i. Which communication protocols are used for M2M LAN? **2**

ii. What are the differences between SDN and NFV? **3**

iii. Explain cloud-based services. **5**

OR iv. Describe how NFV can be used for virtualising IoT devices. **5**

Q.4 i. What is a constrained RESTful Environment? **4**

ii. Describe the process of direct, indirect, resource directory and proxy-based access of CoAP client object to server. **6**

OR iii. Describe any one application layer IoT protocol. **6**

Q.5 i. What is a smart sensor? **3**

ii. Explain different types of sensors and actuators that can be connected with an IoT device. **7**

OR iii. What are the different components needed in a system for RFID IoT applications and services? **7**

Q.6 Attempt any two:

i. Explain various steps involved in the IoT system design methodology. **5**

ii. Explain Raspberry Pi board with suitable diagram. **5**

iii. Write a case study on smart street light control and monitoring. **5**

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Marking Scheme

Faculty of Engineering

End Sem (Odd) Examination Dec-2019

OE00058 Internet of Things

Programme: B.Tech.

Q.1	i.	A Restful web service is a one which is implemented using _____ Principles. b)HTTP & REST	1
	ii.	____ are software components in IoT device which is used for sensing or controlling attached devices. c) Resource	1
	iii.	M2M systems have _____ machine types within M2M area network. a)Homogeneous	1
	iv.	OpenFlow is broadly accepted SDN protocol for _____ interface c)Southbound	1
	v.	XMPP uses _____ a)XML	1
	vi.	CRUD operation is indicated by b) POST, GET,PUT,DELETE	1
	vii.	IIoT uses features of _____ and IoT. d) Industry 4.0	1
	viii.	LED is an _____ which emits light or infrared radiation. b) Actuator	1
	ix.	_____ is the microcontroller used in Arduino Uno. a)ATmega328	1
	x.	_____ instruction set architecture is used in Raspberry Pi d) ARM	1
Q.2	i.	Explanation with example	2
	ii.	Explanation with example **2M** Diagram of publish/subscribe model **1M**	3
	iii.	What are the architectural constraints of REST principles? Description of Each constraint **1M**	5
OR	iv.	What are various applications of IoT? Elaborate how IoT is helpful in each. List of Applications of IoT (5 minimum) **2M** Utilization of IoT in various applications **3M**	5
Q.3	i.	Which communication protocols are used for M2M LAN? List of protocols used in IoT/M2M **2M**	2
	ii.	What are the differences between SDN and NFV? **Each difference carries 1 Marks**	3
	iii.	Explain cloud-based services. Define cloud technology **1M** **Cloud based services: IaaS, PaaS, SaaS with explanation 3M** Quoting Examples **1M**	5
OR	iv.	Describe how NFV can be used for virtualising IoT devices. Related Diagram **2M** **Description of NFV used for virtualization 3M**	5
Q.4	i.	What is a Constrained RESTful Environment? Constraint of power, bandwidth, size of data usually in 10s of bytes. Explanation of Routing Over Low power and Loss (ROLL) network. Devices may sleep in between, or connectivity may be broken.	4
	ii.	Describe the process of direct, indirect, resource directory and proxy based access of CoAP client object to server. Related diagram **3M** **Direct/Indirect 1M** Resource Directory explanation 1M Proxy based access 1M	6
OR	iii.	Describe any one application layer IoT protocol. Working of protocol **3M** Features **3M**	6

		Any one IoT protocol such as CoAP, MQTT, XMPP, DDS, WebSocket, AMQP etc.	
Q.5	i.	What is a smart sensor? Smart sensor has sensing capability as well as it supports communication of sensed data.	3
	ii.	Explain different types of sensors and actuators that can be connected with an IoT device. List of Sensors 1.5M **List of Actuators 1.5M** Explanation of various Sensors **2M** Explanation of various Actuators **2M**	7
OR	iii.	What are the different components needed in a system for RFID IoT applications and services? Related Diagram **3M** **Different components explanation 4M**	7
Q.6		Attempt any two:	
	i.	Explain various steps involved in the IoT system design methodology. All the steps required in IoT system design **3.5M** **Diagram 1.5M**	5
	ii.	Explain Raspberry Pi board with suitable diagram. Raspberry Pi versions and their features **1M** **Board description 2M** Board diagram with GPIO pins description **2M**	5
	iii.	Write a case study on smart street light control and monitoring. Smart street Light control and monitoring concept **1M** **Implementation Description 3M** **Diagram 1M**	5

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