No. of Printed Pages : **8**

A9.4-R5 Internet of Things : A Practical Approach

DURATION : 03 Hours **MAXIMUM MARKS : 100**

OMR Sheet No. :						

Roll No. :						

Answer Sheet No. :						

Name of Candidate : _____ **; Signature of Candidate :** _____

INSTRUCTIONS FOR CANDIDATES :

- Carefully read the instructions given on Question Paper, OMR Sheet and Answer Sheet.
- Question Paper is in English language. Candidate has to answer in English language only.
- There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions.
- **PART ONE** is Objective type and carries **40** Marks. **PART TWO** is Subjective type and carries **60** Marks.
- **PART ONE** is to be answered in the **OMR ANSWER SHEET** only, supplied with the question paper, as per the instructions contained therein. **PART ONE** is **NOT** to be answered in the answer book for **PART TWO**.
- Maximum time allotted for **PART ONE** is **ONE HOUR**. Answer book for **PART TWO** will be supplied at the table when the Answer Sheet for **PART ONE** is returned. However, Candidates who complete **PART ONE** earlier than one hour, can collect the answer book for **PART TWO** immediately after handing over the Answer Sheet for **PART ONE** to the Invigilator.
- **Candidate cannot leave the examination hall/room without signing on the attendance sheet and handing over his/her Answer Sheet to the invigilator. Failing in doing so, will amount to disqualification of Candidate in this Module/Paper.**
- After receiving the instruction to open the booklet and before answering the questions, the candidate should ensure that the Question Booklet is complete in all respects.

DO NOT OPEN THE QUESTION BOOKLET UNTIL YOU ARE TOLD TO DO SO.

PART ONE

(Answer all the questions)

1. Each question below gives a multiple choice of answers. Choose the most appropriate one and enter in the "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)

1.1 Arduino UNO requires power source of _____ to operate.

(A) 1.0 - 5.0 Volts
(B) 2.7 - 5.5 Volts
(C) 5.0 - 7.0 Volts
(D) 10.0 - 15.0 Volts

1.2 ESP 8266 is _____.

(A) Microprocessor
(B) Microcircuit
(C) Microcontroller
(D) Microcomputer

1.3 ESP 8266 is :

(A) Low Power, Highly integrated Wi-Fi Solution
(B) High Power, Highly integrated Wi-Fi Solution
(C) Low Power, Highly distributed Wi-Fi Solution
(D) Low Power, Highly integrated Wired Solution

1.4 Transducer converts :

(A) One form of dependent variable to another form of independent variable
(B) One form of energy to another form of energy
(C) One form of power to another form of power
(D) One form of independent variable to another form of independent variable

1.5 Sensor is a device that :

(A) Measures physical quantity and convert that into measurable signal
(B) Measures physical quantity and convert that into a constant signal
(C) Measures virtual quantity and convert that into a constant signal
(D) Measures virtual quantity and convert that into a measurable signal

1.6 Actuators converts :

(A) Message into motion
(B) Energy into motion
(C) Energy into message
(D) Analog signal to digital signal

1.7 A good sensor needs :

(A) Precision
(B) Accuracy
(C) Resolution
(D) All

1.8 The ATmega328P running at upto :

(A) 80 MHz
(B) 60 MHz
(C) 40 MHz
(D) 20 MHz

1.9 MQTT is abbreviation for :

(A) Message Queuing Telemetry Transport
(B) Message Queuing Transport Telemetry
(C) Manage Queuing Tracking Transport
(D) Manage Queuing Tracking Telemetry

1.10 MQTT invented by :

(A) HP
(B) Apple
(C) IBM
(D) Xerox

2. Each statement below is either TRUE or FALSE. Choose the most appropriate one and enter your choice in the "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)

2.1 MQTT is quite useful for connections with remote locations where a small code footprint is required and/or network bandwidth is at a premium.

2.2 MQTT runs over MAC layer.

2.3 Combining IoT with edge computing and cloud solutions delivers slow response times and decelerates data processing capabilities.

2.4 The ESP 8266 Node MCU has 17 GPIO pins in total.

2.5 In ESP 8266, RXD0 and TXD0 are the serial control and bootloading pins. They are primarily used for communicating with the ESP module.

2.6 Smallest change which a sensor can detect is termed as resolution.

2.7 Strain gauge is an active device that converts mechanical motion into change of resistance.

2.8 I2C or IIC, is a synchronous, multi-master/multi-slave, single-ended, serial communication protocol.

2.9 NoSQL, also referred to as "not only SQL", "non-SQL", is an approach to database design that enables the storage and querying of data outside the traditional structures found in relational databases.

2.10 NoSQL databases cannot address large volumes of rapidly changing data.

3. Match words and phrases in column X with the closest related meaning/word(s)/phrase(s) in column Y. Enter your selection in the "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)

X		Y	
3.1	The function of reset button in Arduino Uno	**A.**	UDP
3.2	CoAP was developed to communicate over internet through	**B.**	Many to many protocol
3.3	MQTT is	**C.**	Physical
3.4	The frequency range of Wi-Fi is around	**D.**	4.4 GHz and 5 GHz
3.5	The highest layer in ZigBee architecture	**E.**	2.4 GHz and 5 GHz
3.6	Which is not a type of ZigBee Devices	**F.**	ZigBee Coordinator Device
3.7	The size of an IP address in IPv6 is	**G.**	Resets the ATmega microcontroller
3.8	_____ allows you to connect and login to a remote computer	**H.**	128 bits
3.9	FTP server _____	**I.**	32 bits
3.10	MAC address is _____ address	**J.**	Telnet
		K.	ZigBee Start Device
		L.	Application layer
		M.	Maintains state information

4. Each statement below has a blank space to fit one of the word(s) or phrase(s) in the list below. Choose the most appropriate option, enter your choice in the "OMR" answer sheet supplied with the question paper, following instructions therein. (1x10)

A.	storing and processing	**B.**	I2C	**C.**	three-digit	**D.**	Transport layer
E.	jumbo payload	**F.**	application layer	**G.**	Internet of Things	**H.**	authentication
I.	four-digit	**J.**	integrity	**K.**	publish-subscribe	**L.**	RFC 7252
M.	System on Chip						

4.1 Secure Sockets Layer (SSL) is a security protocol that provides integrity, _____ , and privacy to Internet communications.

4.2 HTTP status codes are _____ responses from the server to the browser-side request.

4.3 File Transfer Protocol (FTP) is an _____ protocol.

4.4 The Two-Wire Interface (TWI) is similar to the _____ interface.

4.5 IoT stands for _____.

4.6 The _____ is an optional feature of IPv6.

4.7 Structured Query Language (SQL) is a programming language for _____ information in a relational database.

4.8 MQTT is a lightweight _____ based messaging protocol.

4.9 Constrained Application Protocol (CoAP) is a specialized Internet application protocol for constrained devices, as defined in _____.

4.10 The ESP 8266 is a _____ device.

PART TWO

(Answer any FOUR questions)

5. (a) Explain the schematic diagram of Arduino Uno.

(b) Write a sketch to be compiled in Arduino IDE to read signal value of pressure sensor at serial monitor. **(7+8)**

6. (a) What is database system ? Why NoSQL is preferred database in IoT environment ?

(b) Illustrate the difference between relational and non-relational database. **(7+8)**

7. (a) Illustrate TCP/IP protocol.

(b) Illustrate MQTT protocol and its utility in IoT environment. **(7+8)**

8. (a) Explain the concept of private and public cloud in the Internet of Things environment.

(b) Illustrate the ZigBee protocol. **(7+8)**

9. (a) Illustrate the security and privacy issues in Industrial IoT scenario.

(b) Compare and contrast among port, socket and websocket. **(7+8)**

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SPACE FOR ROUGH WORK

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