Sl. No.

A9.4-R5 : INTERNET OF THINGS (IoT) : A PRACTICAL APPROACH

अवधि : 03 घंटे **अधिकतम अंक : 100**
DURATION : 03 Hours **MAXIMUM MARKS : 100**

ओएमआर शीट सं. : **OMR Sheet No. :**						

रोल नं. : **Roll No. :** | | | | | | |

उत्तर-पुस्तिका सं. : **Answer Sheet No. :** | | | | | | |

परीक्षार्थी का नाम :
Name of Candidate : _____

परीक्षार्थी के हस्ताक्षर :
Signature of Candidate : _____

परीक्षार्थियों के लिए निर्देश :	**Instructions for Candidate :**
कृपया प्रश्न-पुस्तिका, ओएमआर शीट एवं उत्तर-पुस्तिका में दिये गए निर्देशों को ध्यानपूर्वक पढ़ें।	Carefully read the instructions given on Question Paper, OMR Sheet and Answer Sheet.
प्रश्न-पुस्तिका की भाषा अंग्रेजी है। परीक्षार्थी केवल अंग्रेजी भाषा में ही उत्तर दे सकता है।	Question Paper is in English language. Candidate can answer in English language only.
इस मॉड्यूल/पेपर के **दो भाग** हैं। **भाग एक** में **चार** प्रश्न और **भाग दो** में **पाँच** प्रश्न हैं।	There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions.
भाग एक ''वैकल्पिक'' प्रकार का है जिसके कुल अंक 40 है तथा **भाग दो** ''व्यक्तिपरक'' प्रकार का है और इसके कुल अंक 60 है।	**PART ONE** is Objective type and carries 40 Marks. **PART TWO** is Subjective type and carries 60 Marks.
भाग एक के उत्तर, **ओएमआर उत्तर-पुस्तिका** पर ही दिये जाने हैं। **भाग दो** की उत्तर-पुस्तिका में **भाग एक** के उत्तर **नहीं** दिये जाने चाहिए।	**PART ONE** is to be answered in the **OMR ANSWER SHEET** only. **PART ONE** is **NOT** to be answered in the answer book for **PART TWO**.
भाग एक के लिए अधिकतम समय सीमा **एक घण्टा** निर्धारित की गई है। **भाग दो** की उत्तर-पुस्तिका, **भाग एक** की उत्तर-पुस्तिका जमा कराने के पश्चात् दी जाएगी। तथापि, निर्धारित एक घंटे से पहले **भाग एक** पूरा करने वाले परीक्षार्थी **भाग एक** की उत्तर-पुस्तिका निरीक्षक को सौंपने के तुरंत बाद, **भाग दो** की उत्तर-पुस्तिका ले सकते हैं।	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.
परीक्षार्थी, उपस्थिति-पत्रिका पर हस्ताक्षर किए बिना और अपनी उत्तर-पुस्तिका, निरीक्षक को सौंपे बिना, परीक्षा हॉल/कमरा नहीं छोड़ सकते हैं। ऐसा नहीं करने पर, परीक्षार्थी को इस मॉड्यूल/पेपर में अयोग्य घोषित कर दिया जाएगा।	**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.**
प्रश्न-पुस्तिका को खोलने के निर्देश मिलने के पश्चात् एवं उत्तर लिखना आरम्भ करने से पहले उम्मीदवार जाँच कर यह सुनिश्चित कर लें कि प्रश्न-पुस्तिका प्रत्येक दृष्टि से संपूर्ण है।	After receiving the instruction to open the booklet and before starting to answer the questions, the candidate should ensure that the Question Booklet is complete in all respect.

जब तक आपसे कहा न जाए, तब तक प्रश्न-पुस्तिका न खोलें।
DO NOT OPEN THE QUESTION BOOKLET UNTIL YOU ARE TOLD TO DO SO.

PART ONE

(Answer all the questions; each question carries ONE mark)

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 A program written with the IDE for Arduino is called :

(A) IDE source

(B) Sketch

(C) Cryptography

(D) Source code

1.2 Arduino IDE consists of 2 functions. What are they ?

(A) Build() and loop()

(B) Setup() and build()

(C) Setup() and loop()

(D) Loop() and build() and setup()

1.3 MQTT is mainly used for _____.

(A) M2M communication

(B) Device communication

(C) Internet communication

(D) Wireless communication

1.4 Standard ports of MQTT are _____.

(A) I2C

(B) SSL

(C) USART

(D) TCP/IP

1.5 CoAP provides which of the following requirements ?

(A) Multicast support and simplicity

(B) Low overhead and multicast support

(C) Simplicity and low overhead

(D) Multicast support, Low overhead and simplicity

1.6 What is ESP8266 ?

(A) WIFI module

(B) Sensor

(C) Board

(D) USB cable

1.7 Which sensor is LM35 ?

(A) Pressure sensor

(B) Humidity sensor

(C) Temperature sensor

(D) Touch sensor

1.8 Which of the following component of HTTP response indicates HTTP version ?

(A) Status/Response Code

(B) HTTP Version

(C) Response Header

(D) Response Body

1.9 Which of the following is correct about resource representation in REST ?

(A) REST uses various representations to represent a resource where text, JSON, XML.

(B) XML and JSON are the most popular representations of resources.

(C) Both of the above.

(D) None of the above.

1.10 Which of the following is not a NoSQL database ?

(A) SQL Server

(B) MongoDB

(C) Cassandra

(D) None of the above

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 Arduino provides IDE Environment.

2.2 A RESTful web service client sends a message in form of a Gopher Request and server responds in form of a HTTP Response.

2.3 Web services can treat each method request independently.

2.4 Non-Relational databases require that schemas be defined before you can add data.

2.5 MQTT support security.

2.6 CoAP is designed for use between devices on the same constrained network.

2.7 CoAP has URI and content type.

2.8 There are 14 analog pins in Arduino mega board.

2.9 DHT 11 is a pressure sensor.

2.10 Request field is present in Response message.

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	What is the microcontroller used in Arduino UNO ?	**A.**	Optiboot bootloader
3.2	Default bootloader of the Arduino UNO	**B.**	Automatic Repeat Request
3.3	HTTP	**C.**	ATmega328p
3.4	ARQ stands for	**D.**	Application layer protocol
3.5	Version 6 of IP address has how many bits ?	**E.**	connection oriented protocol
3.6	TCP	**F.**	Cassandra
3.7	Wide Column store	**G.**	128
3.8	NFC	**H.**	Wireless Local Area Network
3.9	802.11g	**I.**	1883
3.10	MQTT runs at port number	**J.**	Near Field Communication
		K.	32
		L.	Arduino Request Query
		M.	No Front Column

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.	sharding	**B.**	user	**C.**	web transfer	**D.**	3
E.	13	**F.**	Message Queue Telemetry Protocol	**G.**	I2C	**H.**	blockchain
I.	Heterogeneity	**J.**	security	**K.**	availability	**L.**	Session
M.	~ Protected						

4.1 MQTT stands for _____.

4.2 Digital pin _____ is built-in LED on Arduino board.

4.3 MongoDB scales horizontally using _____ for load balancing purpose.

4.4 CoAP is a specialized _____ protocol.

4.5 HTTP Response is made up of a _____ status code.

4.6 Application layer interacts directly with the _____.

4.7 Two wire interface is also called as _____.

4.8 _____ in IoT as one of the key characteristics, devices have different hardware platforms and networks.

4.9 In a _____ each block is a cryptographic hash of the previous block.

4.10 IoT devices are naturally vulnerable to _____ threats.

PART TWO

(Answer any FOUR questions)

5. (a) Explain three-layered architecture of IoT.

(b) Explain the characteristics of IoT.

(c) Discuss the security challenges of IoT. **(5+5+5)**

6. (a) Explain MQTT protocol taking a suitable example. Why is MQTT more popular than HTTP in IoT context ?

(b) Explain the different NoSQL database types. Why is NoSQL preferred over relational databases ? **(10+5)**

7. (a) Write a sketch to be compiled in Arduino IDE to read signal value of sensor MQ135 at serial monitor.

(b) Explain the different service models of cloud computing. **(10+5)**

8. (a) Write down the steps to program Node MCU on Arduino IDE.

(b) Explain the three pillars of Information security. **(10+5)**

9. Briefly explain **any three** of the following.

(i) ZigBee

(ii) Web server

(iii) REST Services

(iv) CoAP Protocol

(5+5+5)

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SPACE FOR ROUGH WORK

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