

Sl. No.

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

अवधि : 03 घंटे

DURATION : 03 Hours

अधिकतम अंक : 100

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 हैं तथा भाग दो "व्यक्तिपरक" प्रकार का है और इसके कुल अंक 60 हैं।  | 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)**

**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** \_\_\_\_\_ is a low power, highly integrated Wifi solution, capable of working in wide temperature range.

- (A) 8051
- (B) ESP8266
- (C) IC555
- (D) 8086

**1.2** Digital-to-analog conversion can be accomplished in following ways :

- (A) Amplitude Shift Keying (ASK)
- (B) Frequency Shift Keying (FSK)
- (C) Phase Shift Keying (PSK)
- (D) All the above

**1.3** Web services can be implemented by :

- (A) HTTP and REST principles
- (B) Websockets
- (C) Both (A) and (B)
- (D) None of these

**1.4** Multiple access protocols are \_\_\_\_\_.

- (A) Random access
- (B) Controlled access
- (C) Channelization.
- (D) All the above

**1.5** Zigbee architecture may have the following component \_\_\_\_\_.

- (A) Full Function Devices
- (B) Reduced Function Devices
- (C) PAN Coordinator
- (D) All of the above

**1.6** Which of the following is true about php variables ?

- (A) Variables can, but do not need, to be declared before assignment.
- (B) Variables in PHP do not have intrinsic types.
- (C) Variables used before they are assigned have default values.
- (D) All of the above

**1.7** The output of digital sensors are always :

- (A) Analog
- (B) Digital
- (C) Both (A) and (B)
- (D) None of these

**1.8** Which of the following is a component of a Web Service architecture ?

- (A) UDDI
- (B) WSDL
- (C) SOAP
- (D) All of the above

**1.9** A client/server application that identifies each host on the Internet with a unique user-friendly name is known as \_\_\_\_\_.

- (A) Peer to Peer System
- (B) The Domain Name System (DNS)
- (C) Robust System
- (D) Centralized System

**1.10** Transmission mode(s) used in FTP is/are \_\_\_\_\_.

- (A) Stream
- (B) Block
- (C) Compressed
- (D) All 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 MQTT is a light weight messaging protocol based on the publish-subscribe model.

2.2 We cannot develop applications on Node MCU using Arduino development environment.

2.3 ESP8266 has both types of memory on die, i.e., ROM AND RAM both.

2.4 Data Analytics can be performed either locally or on the cloud.

2.5 REST is unidirectional but Websocket is bidirectional.

2.6 NoSQL Database supports retrieving records through the Oracle Database External Table functions.

2.7 ThingSpeak is often used for prototyping and proof of concept IoT systems that require analytics.

2.8 WiFi-Direct always needs an access point for communications with external devices.

2.9 A web service takes the help of WSDL to describe the availability of service.

2.10 Cyber security deals in controlling access to system hardware and protecting against harm that may be done via network access, malicious data and code injection.

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  | WEBSOCKET  | A. | IIOT                                      |
| 3.2  | Responsible for controlling access to the network based on the predefined policy.  | B. | UDDI                                      |
| 3.3  | IPv4   | C. | HTTP                                      |
| 3.4  | Connecting machines to other machines/data management, optimization and productivity that possibly make “smart factories”. | D. | PGP                                       |
| 3.5  | Seen with SOAP and WSDL as one of the three foundation standards of web services.  | E. | Quadrature Amplitude Modulation (QAM)     |
| 3.6  | HTTPS  | F. | Variable                                  |
| 3.7  | Client/Server application that allows a user to logon to a remote machine, giving the user access to the remote system.    | G. | 32 bit protocol                           |
| 3.8  | CoAP   | H. | TELNET                                    |
| 3.9  | The main protocol used to access data on the World Wide Web (WWW).   | I. | Secured Protocol                          |
| 3.10 | A framework for managing devices in an internet using the TCP/IP protocol suite.   | J. | SNMP (Simple Network Management Protocol) |
|      |  | K. | Application Layer Protocol                |
|      |  | L. | Security management                       |
|      |  | M. | Full Duplex                               |

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. | RFID                       | B. | Virtual Private Network (VPN) | C. | NoSQL                      |
| D. | Key                        | E. | CoAP                          | F. | Node to Node communication |
| G. | Topology                   | H. | Digital Signature             | I. | IoT                        |
| J. | Secure Sockets Layer (SSL) | K. | MQTT                          | L. | Datagrams                  |
| M. | 17                         |    |                               |    |                            |

- 4.1 \_\_\_\_\_ is web-objects communication using request/response interactions model.
- 4.2 The ESP8266 has \_\_\_\_\_ GPIO pins.
- 4.3 \_\_\_\_\_ Data written at one node replicates to multiple nodes.
- 4.4 Packets in the IPv4 layer are called \_\_\_\_\_.
- 4.5 A number or a set of numbers on which the cipher operates \_\_\_\_\_.
- 4.6 \_\_\_\_\_ refers to the physical or logical arrangement of a network.
- 4.7 \_\_\_\_\_ is lightweight publish-subscribe based messaging protocol.
- 4.8 Provide privacy for LANs that must communicate through the global Internet is\_\_\_\_\_.
- 4.9 Communicates a strings for ID, a time-stamp and location data \_\_\_\_\_.
- 4.10 The Industrial Internet of Things (IIoT) refers to the extension and use of the \_\_\_\_\_ in Industrial Sector and Application.

## PART TWO

(Answer any FOUR questions)

5. (a) What is GPIO ? How many GPIO pins are there in ESP8266 microcontroller ? Specify the functions of each GPIO pin along with the associated states and restrictions if any.
- (b) Why do many sensors have three or four terminals for communication to microcontroller ? How are such sensors used for IoT Applications and Services ? (7+8)
6. (a) Connection oriented and connection less are transport layer services. What are the differences between them ?
- (b) What is CoAP and why is it used ? What are the features of CoAP ? (7+8)
7. (a) Compare the Port, Socket and WebSocket by examples.
- (b) What are the various device types that are adopted in Zigbee ? Give a brief description. (7+8)

8. (a) What is MQTT ? When is it used ? What are the salient features of MQTT ?
- (b) What are the security model profiles and protocols for the IoT ? (8+7)
9. (a) What are the four cloud deployment models ? Explain.
- (b) What are the different cloud based services for IoT applications ? (8+7)

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SPACE FOR ROUGH WORK

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