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

<table>
<tr><td>अवधि : 03 घंटे
DURATION : 03 Hours</td><td>अधिकतम अंक : 100
MAXIMUM MARKS : 100</td></tr>
</table>

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 Candidates :
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 अंग्रेजी भाषा में है। परीक्षार्थी उत्तर लिखने के लिए केवल अंग्रेजी भाषा का ही प्रयोग कर सकते हैं।	Question Paper is in English language. Candidate has to 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, इस प्रश्न-पत्र के साथ दी गई **ओएमआर उत्तर-पुस्तिका** पर, उसमें दिये गए अनुदेशों के अनुसार 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, 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**.
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 यह जाँच कर 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 ESP8266 is a _____.

    (A)   Microprocessor

    (B)   CPU

    (C)   Memory

    (D)   Microcontroller

1.2 NodeMCU Development board is featured with :

    (A)   wifi capability

    (B)   digital and analog pins

    (C)   serial communication protocols.

    (D)   All the above

1.3 The output of analog sensors are always :

    (A)   analog

    (B)   digital

    (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 Multicast addresses in IPv4 are those that start with the pattern _____.

    (A)   1100

    (B)   1110

    (C)   1111

    (D)   None of the above

1.6 IoT revolution is because of the advancements in _____.

    (A)   Sensor Networks

    (B)   Mobile devices

    (C)   Wireless communications

    (D)   All of the above

1.7 802.15.4 is a _____

    (A)   Low cost, low speed communications for power constrained devices

    (B)   Collection of standards for Low-rate wireless personal area networks (LR-WPANs)

    (C)   Both (A) and (B)

    (D)   None of the above

1.8 Publisher-subscriber model involves _____.

(A) publishers

(B) brokers

(C) Consumers

(D) All of the above

1.9 Zigbee specification are based on _____.

(A) 802.11

(B) 802.15.4

(C) 804.13.6

(D) None of the above

1.10 Features of NoSQL _____.

(A) More scalable

(B) Provide superior performance as compared to Relational Database systems

(C) Object-oriented programming that is easy to use and flexible

(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 Threat analysis means uncovering the security design flaws.

2.2 A minimum of 7 external components can be added to ESP 8266.

2.3 CoAP runs on top of TCP instead of UDP.

2.4 Virtualization Technology is the main technology behind the development of Cloud Model.

2.5 To ensure secure access in IIoT, we need to consider using advanced face and voice recognition systems and biometrics.

2.6 In ThingSpeak, MATLAB analytics is included to analyze and visualize the data received from your Hardware or Sensor Devices.

2.7 session_start() functionis used to access session variables in PHP

2.8 Zigbee supports both topologies, i.e., Star topology and Peer-to-peer topology.

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

2.10 Service Transport is responsible for encoding messages in a common XML format so that messages can be understood at either end.

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)

	Column X		Column Y
3.1	IPv6	A.	sliding window mechanism,
3.2	Request-Response communication model	B.	GET, PUT, POST
3.3	Supports to create multiple virtual environments onto the same physical hardware in Cloud Environments	C.	Application Layer Protocol
3.4	HTTP COMMANDS	D.	128 bit protocol
3.5	HTML	E.	6LoWPAN
3.6	IoT analytics platform service that allows you to aggregate, visualize and analyze live data streams in the **cloud**	F.	REST
3.7	MQTT	G.	SNMP (Simple Network Management Protocol)
3.8	IPv6 over low power WPANs	H.	Markup Language
3.9	The main protocol used to access data on the World Wide Web (WWW).	I.	ThingSpeak
3.10	A framework for managing devices in an internet using the TCP/IP protocol suite.	J.	Post Office Protocol, version3 (POP3)
		K.	HTTP
		L.	Virtual Machine Monitors
		M.	DHCP

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	Protocol	B	Virtual Private Network (VPN)	C	Encoder	D	Access Control
E	IP Security (IPSec)	F	Node to Node communication	G	Topology	H	Digital Signature
I	Micro processor	J	Secure Sockets Layer (SSL)	K	Binary micro program	L	Data grams
M	Zigbee						

4.1 _____ refers to the physical or logical arrangement of a network.

4.2 Data link control deals with _____.

4.3 _____is a digital circuit that converts information into coded form.

4.4 Packets in the IPv4 layer are called_____.

4.5 _____ ensure secure access using advanced face and voice recognition systems & biometrics.

4.6 An asymmetric-key system is needed in _____.

4.7 A collection of protocols designed by the IETF (Internet Engineering Task Force) to provide security for a packet at the network level is _____.

4.8 _____ provides privacy for LANs that must communicate through the global Internet.

4.9 _____ provide security and compression services to data generated from the application layer.

4.10 An emerging standard that is based on the IEEE 802.15.4 and adds network construction (star networks, peer-to-peer/mesh networks, and cluster-tree networks) is _____

PART TWO

(Answer any FOUR questions)

5. (a) Give a brief hardware specifications and functions of ESP8266 microcontroller. How many boot modes are there in it ? Give brief description about each boot mode.

(b) What are the advantages of using NODEMCU MQTT client with Arduino IDE ? **[7+8]**

6. (a) What are the uses of analog sensor ? What are the uses of digital sensors ?

(b) What is software library ? What is the significance of creating this library ? **(7+8)**

7. (a) How does the data communicate from a gateway using an IP address after formatting as packets ?

(b) What is Zigbee? What are the layers of Zigbee ? Also give the functions of each layer. **(7+8)**

8. (a) What is NOSQL and what are the NOSQL usages ?

(b) List the data types, which communicate from RFIDs in Internet of RFIDs.

(c) List the SQL functionalities. **(5+5+5)**

9. (a) What are the cloud computing features and advantages of using it ? What are the main concerns in using it ?

(b) What are the different types of cloud services ? Explain. **(8+7)**

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SPACE FOR ROUGH WORK