

Sl. No.

A10.4-R5 : INTERNET OF THINGS USING RASPBERRY PI

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 respect.

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 What is the microcontroller used in Arduino Uno ?

- (A) ATmega328p
- (B) ATmega2560
- (C) ATmega32114
- (D) AT91SAM3x8E

1.2 Which board is first to use microcontroller within build USB ?

- (A) Lily Pad
- (B) UNO
- (C) Raspberry Pi
- (D) Leonardo

1.3 What is Ethernet/LAN cable used in RaspberryPi ?

- (A) Cat5
- (B) Cat5e
- (C) Cat6
- (D) RJ45

1.4 Which of the following parameters have default values in Raspberry Pi ?

- (A) Port_Name and Bits
- (B) Speed and Port_Names
- (C) Speed and Parity
- (D) Stop Bit and Flow Control

1.5 Which all distributions are supported by Raspberry Pi ?

- (A) Arch Linux
- (B) Debain
- (C) Fedora
- (D) All of the above

1.6 SOA stands for :

- (A) Solution Oriented Architecture
- (B) Sector Oriented Architecture
- (C) Service Oriented Architecture
- (D) Source Oriented Architecture

- 1.7 Resolution in IOT sensors is expressed in terms of :
- (A) Milli volts
 - (B) Ampere
 - (C) Milli Ampere
 - (D) Volts
- 1.8 Nyquist rate is defined as :
- (A) Twice the lowest frequency
 - (B) Twice the highest frequency
 - (C) Thrice the lowest frequency
 - (D) Thrice the highest frequency
- 1.9 To avoid aliasing we use the following filter in IOT :
- (A) Digital filter
 - (B) Aliasing filter
 - (C) Analog filter
 - (D) Anti-Aliasing filter
- 1.10 What is the use of accelometer sensors in laptops ?
- (A) To rotate the screen
 - (B) To protect hard drives from damage
 - (C) To get the angle on monitor
 - (D) To get the linear acceleration
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 Raspberry Pi has its own internal memory.
 - 2.2 Female HDMI is used to connect TV to RPi.
 - 2.3 Charger and adapter is used to provide power supply to RPi.
 - 2.4 RJ45 cable is used in RPi for Ethernet/LAN connection.
 - 2.5 Root is the default user in Debian on Raspberry Pi.
 - 2.6 Both 64 and 32 bit processors are used in Pi 3.
 - 2.7 The speed of operations in raspberry Pi 3 is 1.2 GHz.
 - 2.8 There are 5 default ports available in Raspberry Pi 3.
 - 2.9 The MQTT protocol uses client server model.
 - 2.10 IPv6 is a security protocol for IoT.

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	PAN	A.	GSM, GPRS
3.2	MAN	B.	CSMA/CA
3.3	WAN	C.	1 to 2 Mbps
3.4	802.11	D.	Peer to peer
3.5	802.11n	E.	MMDS, LMDS
3.6	802.15.4	F.	Layer 3 and above
3.7	Sensor	G.	PAN coordinator
3.8	Transducer	H.	Scalar and Vector
3.9	FFD	I.	Sensor and Actuator
3.10	Zigbee	J.	FFD and RFD
		K.	802.3
		L.	MQTT
		M.	HDMI

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.	Broker	B.	OMA-DM	C.	128	D.	Topic
E.	Zigbee	F.	MQTT	G.	AMQP	H.	COAP
I.	Packets	J.	XMPP	K.	Network Interface Card	L.	TCP/IP
M.	132						

- 4.1 _____ is a publish-subscribe based lightweight messaging protocol used in conjunction with TCP/IP
- 4.2 A message _____ controls the publish subscribe messaging pattern in MQTT.
- 4.3 The MQTT broker routes the messages to clients based on _____.
- 4.4 _____ protocol is designed for M2M applications such as building automation.
- 4.5 Data in network layer is transferred in the form of _____.
- 4.6 IPv6 uses _____ bits for representing address.
- 4.7 _____ IoT protocol is based on client server architecture and is based on XML.
- 4.8 _____ translate IP address into MAC address.
- 4.9 Exchange, queue and binding are the components of _____ protocol.
- 4.10 _____ is a low-power, low data rate and close proximity (i.e., personal area) wireless adhoc network.

PART TWO

(Answer any four questions)

5. (a) Explain the service oriented architecture of IoT technology with layer diagram.
- (b) What are the specific challenges associated with IoT communication over normal wired communication.
- (c) Discuss in detail the various errors that may come in measuring the physical phenomenon using IoT sensors.

(5+5+5)

6. Briefly explain the working and use on following protocols **(any three)**.

- (a) MQTT
- (b) CoAP
- (c) XMPP
- (d) AMQP

(5+5+5)

7. (a) Draw and explain the use of IoT in transportation using Raspberry Pi.

- (b) How IoT is useful in healthcare ?

(8+7)

8. (a) Give the complete IEEE 802.15.4 MAC frame structure and working of its subfields.

- (b) How Zigbee is different from IEEE 802.15.4 ? Explain.

(8+7)

9. (a) What are TLS protocols and its protocol stack ? What is TLS handshake ?

- (b) What is IPv6 ? How it can be used to resolve the challenges in IoT ?

(8+7)

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SPACE FOR ROUGH WORK

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