# A10.4-R5 : INTERNET OF THINGS (IoT) USING RASPBERRY PI

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 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. |

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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 pwd command displays :

(A) User password

(B) Password file content

(C) Present working directory

(D) None of the mentioned

1.2 Which are the two lines used in the I2C ?

(A) SDA and SPDR

(B) SPDR and SCL

(C) SDA and SCL

(D) SCL and status line

1.3 What is the output of this expression, 3*1**3 ?

(A) 27

(B) 3

(C) 9

(D) 1

1.4 What is the default user in Debain on Raspberry Pi ?

(A) Default

(B) User

(C) Pi

(D) Root

1.5 Which component is not contained on the Raspberry Pi B+ board ?

(A) USB Ports

(B) Analog to Digital Converter

(C) Ethernet Port

(D) Micro SD Slot

1.6 Linux file system contains mainly :

(A) Ordinary files

(B) Device files

(C) Directory files

(D) All of the mentioned

1.7 Which keyword is used for function in Python ?

(A) Fun

(B) Define

(C) Def

(D) Function

**1.8** What will be the output of the following Python function ?

Import math

abs (math.sqrt (961))

(A) 31.0

(B) − 31

(C) Error

(D) 32

**1.9** Full form of MQTT _____.

(A) Message Queuing Telemetry Transport

(B) Message Queuing Telegram Transport

(C) Message Queue Telegram Transport

(D) Message Queue Telemetry Transport

**1.10** What is WordPress ?

(A) Framework

(B) Content Management System

(C) Programming Language

(D) Operating System

**2.** **Each statement below is either TRUE or FALSE. Choose the most appropriate one and ENTER in the "OMR" answer sheet supplied with the question paper, following instructions therein.**

**(1x10)**

**2.1** The expression Int(x) implies that the variable x is converted to integer.

**2.2** The value of the expressions $4/(3*(2-1))$ and $4/3*(2-1)$ is the same in Python.

**2.3** Raspberry Pi can execute Python 3 code, but not Python 2.

**2.4** raspi-config is a configuration tool in Raspbian.

**2.5** The Raspberry Pi comes with Linux pre-installed.

**2.6** GPIO.analog Read function is used to read an analog value on a pin.

**2.7** Raspberry Pi's GPIOs can be used to control DC motor rotation.

**2.8** chmod command can take multiple filenames as arguments.

**2.9** Correct indentation is essential for your Python program to work.

**2.10** There are 16 data lines in a 16*2 alphanumeric LCD.

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 | Python Web Framework | A. | dmesg |
| 3.2 | SBC | B. | mkdir |
| 3.3 | NOOBS | C. | temperature sensor |
| 3.4 | Command creates a new directory | D. | GPIO.input() |
| 3.5 | Command is used to change the ownership of a file | E. | software Board Computer |
| 3.6 | Command shows the Kernel log messages | F. | chown |
| 3.7 | Python module used for fetching URLs | G. | pressure sensor |
| 3.8 | Function is used to read a digital value on a pin of raspberry pi using Python | H. | single Board Computer |
| 3.9 | Allows a command to execute with root permission | I. | urllib2 |
| 3.10 | LM35 | J. | root |
| | | K. | bottle |
| | | L. | operating system install manager |
| | | M. | rm |

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

| A. | Apache | B. | ps | C. | Node-RED | D. | ARM |
|---|---|---|---|---|---|---|---|
| E. | json | F. | Package Management System | G. | Tuple | H. | Machine to Machine and Internet of Things |
| I. | X86 | J. | List | K. | GPIO.setup() | L. | PIP Installs Packages |
| M. | Wiring Pi | | | | | | |

**4.1** _____ is a library written in C used to access GPIO pins on Raspberry for BCM2835 (Broadcom Processor) SoC (System on Chip).

**4.2** _____ instruction set architecture is used in Raspberry Pi.

**4.3** The _____ is a data type available in Python which can be written as a list of comma-separated values (items) between square brackets.

**4.4** _____ command shows a list of running processes.

**4.5** _____ function determines whether a pin will be used as an input or an output.

**4.6** Python has a built-in package called _____ which can be used to work with JSON (JavaScript Object Notation) data.

**4.7** _____ is a popular web server application you can install on the Raspberry Pi to allow it to serve web pages.

**4.8** _____ is a visual tool for wiring the Internet of Things that can be run on a Raspberry Pi and allows for rapid prototyping of projects.

**4.9** MQTT is _____ protocol.

**4.10** PIP stands for _____.

**PART TWO**

**(Answer any FOUR questions)**

5. (a) Briefly explain about the layers in IoT Architecture and the protocol associated with each of the layers.

   (b) What is Single Board Computer (SBC) ? Explain advantages and disadvantages of SBC. **(8+7)**

6. (a) What is the Raspberry Pi ? Explain different components of a Raspberry Pi board.

   (b) Give the steps involved in the installation of Raspbian OS. **(10+5)**

7. (a) Briefly explain about the various applications of IoT in smart system design.

   (b) What is a Shell Script and how does it work ? **(10+5)**

8. (a) Explain automated IoT plant Irrigation system using Raspberry Pi.

   (b) How to use Wiring Pi library on Raspberry Pi ? **(8+7)**

9. (a) Explain GPIO of Raspberry Pi board in detail.

   (b) What is Node-RED ? Explain the features of Node-RED. Can we create user defined functions in Node-Red ? **(8+7)**

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