A10.4-R5 : INTERNET OF THINGS 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.

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 Which operating systems is Thonny available for ?

(A) Linux (Raspbian)

(B) macOS

(C) Windows

(D) All of the above

1.2 What does IDLE stand for ?

(A) Integrated Development and Learning Environment

(B) Integrated Design and Learning Environment

(C) Integrated Design and Leading Environment

(D) Integrated Development and Leading Environment

1.3 How many ground pins are there on the GPIO ?

(A) 7

(B) 8

(C) 9

(D) 6

1.4 The default port used by CherryPy is :

(A) 8081

(B) 8080

(C) 8888

(D) 8000

1.5 How would we set up our MotionSensor to read from GPIO pin 4 ?

(A) Connect the positive pin to GPIO 4, the negative pin to GND and the signal pin to 5 Volts

(B) Connect the positive pin to 5 Volts, the negative pin to GPIO 4 and the signal pin to GND

(C) Connect the positive pin to GND, the negative pin to GPIO 4 and the signal pin to 5 Volts

(D) Connect the positive pin to 5 Volts, the negative pin to GND and the signal pin to GPIO 4

1.6 DHT11 sensor :

(i) high-priced and highly accurate sensor for temperature and humidity

(ii) can detect UV rays from the sun and comes pre-installed with Raspbian

(A) Both (i) and (ii) are correct

(B) Only (i) is correct

(C) Only (ii) is correct

(D) Both (i) and (ii) are not correct

1.7 To see the permissions and ownership information relating to files and directories, which of the following command is used ?

(A) ls command with the option -a.

(B) ls command with the option -l.

(C) ls command with the option -r.

(D) ls command with the option -x.

1.8 Which of the following command is used to change the permissions on a file ?

(A) chown

(B) scrot

(C) chmod

(D) touch

1.9 To make JavaScript everywhere technology :

(i) Node.js allows for the execution of JavaScript code outside of the browser.

(ii) JavaScript can be used both on the server side and client side for web applications.

(A) Only (i) is true

(B) Only (ii) is true

(C) Both (i) and (ii) are true

(D) Both (i) and (ii) are false

1.10 Which is far easier to access the GPIO ?

(A) gpiozero library

(B) RPi.GPIO library

(C) Both of the above

(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 The microSD card slot is located at the bottom of the Raspberry Pi.

2.2 To shutdown the Raspberry Pi, select **Shutdown** from the **Application** menu.

2.3 You may only install the Raspbian OS with NOOBS.

2.4 The library that we require to work with MQTT comes pre-installed with Raspbian.

2.5 A Raspberry Pi with code written by students was deployed on the international space station.

2.6 Raspberry Pi's GPIO has pins that supply both 5 V and 3.3 V.

2.7 Using Fritzing, we are able to design a GPIO circuit for our Raspberry Pi.

2.8 It is far easier to use the gpiozero library to access the GPIO than it is to use the RPi.GPIO library.

2.9 Basic alarm systems are far too complicated to create for our Raspberry Pi.

2.10 The DHT11 sensor is a high-priced and highly accurate sensor for temperature and humidity.

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	Adafruit_DHT	**A.**	Raspberry Pi HAT
3.2	IDLE	**B.**	Temperature and humidity
3.3	Pibrella	**C.**	Python
3.4	gpiozero	**D.**	RPi-Cam-Web-Interface
3.5	T.A.R.A.S	**E.**	Robot
3.6	LDR	**F.**	Wireless
3.7	GPIO	**G.**	Display Device
3.8	Bluetooth	**H.**	Linux Command
3.9	MQTT	**I.**	Input/Output
3.10	HDMI	**J.**	Sensor
		K.	Hygrometer
		L.	Operating System
		M.	Protocol

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 attached to the question paper, following instructions therein.** (1x10)
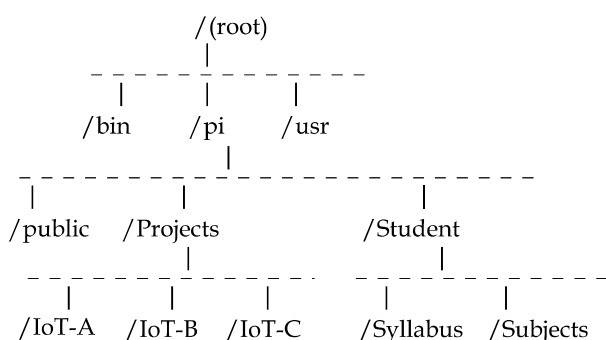
A.	Sense HAT	**B.**	Adafruit_DHT	**C.**	IBM Watson	**D.**	Mosquitto
E.	gpiozero	**F.**	Twilio	**G.**	ipconfig	**H.**	ifconfig
I.	3	**J.**	pi / raspberry	**K.**	pwd/passwd	**L.**	2
M.	Python						

4.1 _____ the name of the service we used to send text messages from our Raspberry Pi.

4.2 To find the IP address of your Raspberry Pi, you need to issue this command _____.

4.3 _____ is the default username and password for Raspbian OS.

4.4 _____ is a system capable of answering questions posted in natural language.

4.5 _____ python package do we use to control the servo motor.

4.6 The name of the library we use to read temperature and humidity sensory data is _____.

4.7 _____ program (platform) may we use to install an MQTT Broker locally.

4.8 In python, the output of **79//25** is _____.

4.9 In python, the output of **3&2** is _____.

4.10 _____ emulator may be used to interact with outside sensors connected to the GPIO.

PART TWO
(Answer any FOUR questions)

5. (a) There are two models of Raspberry Pi, A and B. Which model is suitable for IoT applications ? Justify your answer with necessary technical details by comparing and contrasting the above two models.

 (b) Explain the detail steps of installing Raspbian operating system on Raspberry Pi. **(7+8)**

6. Assume the following tree structure of file system.

```
                /(root)
                   |
     _ _ _ _ _ _ _ _ _ _ _ _ _ _
     |         |         |
   /bin       /pi       /usr
              |
 _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
  |            |                 |
/public    /Projects          /Student
              |                 |
 _ _ _ _ _ _ _ _ _ _ _ _ . _ _ _ _ _ _ _ _ _ _
  |        |        |        |         |
/IoT-A   /IoT-B   /IoT-C   /Syllabus  /Subjects
```

Also, assume your current working directory is **pi**. Write Linux commands sequentially for the following questions.

 (a) Give the detailed long list of the files and directories in **pi**.
 (b) Create a directory "**New_Project**" inside the directory of Student.
 (c) Copy the 'IoT-A' directory inside the '**New_Project**' directory.
 (d) Create a new file 'myproject.py' in the '**New_Project**' directory.
 (e) Change the permissions of the file **myproject.py** into
    (i) read, write, executable for user
    (ii) read, executable for group and
    (iii) read only for others. **(3+3+3+3+3)**

7. (a) Explain how IoT using Raspberry Pi has been explored by GPIO that connects to the outside world with simple rules to reduce the risk of damaging your Raspberry Pi.

 (b) IoT enables to establish a pipeline between the devices present in the real world to the cloud in the virtual world. Justify the above statement with the reference architecture of IoTFW.js with Raspberry Pi. **(7+8)**

8. (a) Connecting devices through the Internet of Things (IoT) requires cloud and web services. Explain three cloud and web service providers with their corresponding services in the context of real world IoT application.

 (b) Explain how IoT can be useful in the application healthcare system using Raspberry Pi and smart wearable's with hardware setup details ? **(7+8)**

9. (a) What is the difference between an active buzzer and a passive one ? What sensors are included with Sense HAT ?

 (b) Enlist and brief communication interfaces in Raspberry_Pi using Python.

 (c) IoT enables galaxy of applications. Enlist few applications of IoT implemented using Raspberry Pi. **(5+5+5)**

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