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B.Tech DEGREE EXAMINATION, DECEMBER 2023

Fifth, Sixth and Seventh Semester

18ECO109J - EMBEDDED SYSTEM DESIGN USING RASPBERRY PI

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

PART - A (20 × 1 = 20 Marks) Marks BL CO

Answer **all** Questions

1. A function is defined using _____ keyword in python — 1 | 1 | 1
   (A) return_type function_name(parameter list)
   (B) function_name <- function(arg_1, arg_2, ...)
   (C) def function_name():
   (D) function myFunction(p1, p2)

2. What will be the output of the following Python expression? print(int((15-2)/6)) — 1 | 3 | 1
   (A) 1
   (B) 2
   (C) 2.1665
   (D) 1.1665

3. The output of int("1110", 2) statement will be_____. — 1 | 3 | 1
   (A) 7
   (B) 10
   (C) 1110, 1111
   (D) 14

4. Relate the frequency measured and requested in PWM generation of Raspberry Pi _____ — 1 | 1 | 1
   (A) If requested frequency increases stability also increases
   (B) If requested frequency is 10K then measured frequency will be 10K
   (C) If requested frequency is 10K then measured frequency will be 4.4K
   (D) If requested frequency is 10K then measured frequency will be 9.4K

5. H-Bridge is used to change the _____ of the DC motor — 1 | 1 | 2
   (A) speed
   (B) direction
   (C) torque
   (D) power

6. Following piece of code is used in "if "GPIO.input(row_pin): key = keys [row_num] [col_num]" — 1 | 2 | 2
   (A) Keypad interface
   (B) Relay interface
   (C) Rotary encoder interface
   (D) motor speed control

7. Choose non-eligible parameter for GPIO.add_event_detect() — 1 | 3 | 2
   (A) Pin number
   (B) Call back
   (C) GPIO.RISING
   (D) pull_up_down

8. Switches used to bounce ____ times after switch is pressed — 1 | 1 | 2
   (A) Zero
   (B) One
   (C) exactly two
   (D) several

9. GPS module is connected to Raspberry Pi via ---------- — 1 | 1 | 3
   (A) GPIO Pin 18
   (B) GPIO Pin 23
   (C) RXD
   (D) MOSI

10. The number of analog channels that can be connected to MCP3008 is — 1 | 1 | 3
    (A) 1
    (B) 2
    (C) 4
    (D) 8

11.	Accelerometer to work following is a must (A) gravitational force (B) electromagnetic force (C) electromotive force (D) gyrating force	1	2		
12.	Current required for Sparkfun Gas sensor is (A) 150 μA (B) 15 nA (C) 150mA (D) 15 A	1	1	3	
13.	In order to read the temperature reading from DS18B20 sensor_____ (A) We can start reading from the serial I\O port from first byte (B) We have to locate a string 't= 'to find the temperature reading (C) We have to read after two bytes from where't=' string is available (D) We have to read after one byte from where 't=' string is available	1	1	4	
14.	The command grid.setPixel (2,2,4) is_____ (A) Set Pixel at (2,2) 4th color (B) Set pixel at (2,2) red color (C) Set pixel at (2,2) green color (D) The command through error	1	3	4	
15.	SR-04 range finder sensor can measure _____ (A) up to 2 m (B) up to 400 m (C) up to 2 cm (D) up to 400 cm	1	1	4	
16.	To interface a 4-digit LED display with Raspberry Pi _____ protocol is used. (A) RS232 (B) I2C (C) SPI (D) One wire	1	1	4	
17.	The command "@cherrypy.expose" is used for_____ (A) Expose a local variable to all function (B) Expose any function in the web page (C) Expose the method index correspond to the root of webserver (D) Expose the method index correspond to the root of web client	1	2	5	
18.	Which is the correct symbol to insert a comment in JSON? (A) // (B) /*…*/ (C) <!-- … --> (D) JSON doesn't support the comments	1	2	5	
19.	Which of the following is correct about JavaScript? (A) JavaScript is an Object-Based language (B) JavaScript is Assembly-language (C) JavaScript is an Object-Oriented language (D) JavaScript is a High-level language	1	2	5	
20.	Smart phone can be considered as a _____ (A) MQTT client – Subscriber (B) Unix server (C) GPIO client/server (D) Adafruit peer	1	2	5	

PART - B (5 × 4 = 20 Marks)

Answer **any 5** Questions

		Marks	BL	CO
21.	Write a python program to check the given string is palindrome or not.	4	3	1
22.	Write a Python program to get the smallest number from a list.	4	3	1
23.	Write the characteristics of servomotor.	4	1	2
24.	How do Raspberry Pi GPIO interrupts work? Explain with examples.	4	2	2
25.	Write a python code to detect the motion using PIR sensors.	4	3	3
26.	Explain any two cloud services used for IOT development.	4	1	4

		Marks	BL	CO
27.	Assume a Pi-camera is connected to Raspberry Pi. Develop a python code to capture an image and save it as "myimage.png" in memory.	4	3	5

PART - C (5 × 12 = 60 Marks)

Answer **all** Questions

28.	(a) (i) What is dictionary? How are dictionaries different from Lists? (6 Marks) (ii) Write a Python program that repeatedly asks the user to enter product names and prices. Store all of them in a dictionary whose keys are product names and values are prices. And also write a code to search an item from the dictionary (6 Marks)	12	3	1
	(OR)			
	(b) With a neat diagram, Explain the method to interface the Raspberry Pi with LED and write a python program to control the brightness of a LED using PWM.			
29.	(a) With a neat diagram, Explain the method to interface Raspberry pi with unipolar stepper motor. Give the python code to control the direction of the unipolar stepper motor.	12	3	2
	(OR)			
	(b) Interface Raspberry pi with Rotary Quadrature Encoder. Write a python code to detect the rotation using a rotary encoder.			
30.	(a) Develop a method to measure resistance using resistors and capacitor with Raspberry pi. Draw the suitable diagram and give the python code	12	3	3
	(OR)			
	(b) Write the python code to measure temperature using analog temperature sensor (TMP36) and ADC(MCP3008) with Raspberry pi. Draw its schematic diagram also			
31.	(a) Write the python code to log temperature readings recorded from a DS18B20 to a USB flash drive using Raspberry Pi. Draw its schematic diagram also	12	3	4
	(OR)			
	(b) With the required library installation, write the python code to control the pixels of a multi color LED matrix display.			
32.	(a) With the necessary python code, Explain MQTT Protocol - installation and setting account, token creation, reading sensor data and pushing to Things board.	12	3	5
	(OR)			
	(b) Interface a LED with Raspberry Pi and write a Node.js code to blink the LED with 500ms delay for 10s.			

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