Enrollment No.....................................

Faculty of Engineering
End Sem Examination Dec 2024
RA3CO49 Embedded Systems

Programme: B.Tech.   Branch/Specialisation: RA

Duration: 3 Hrs.   **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	PO	CO	PSO
Q.1	i.	What is the primary function of PWM in Arduino? (a) Generating analog signals (b) Controlling voltage levels (c) Generating digital signals with varying duty cycles (d) Managing memory	1	1	1	3	1
	ii.	What is the microcontroller used in Arduino UNO? (a) ATmega32114 (b) AT91SAM3x8E (c) ATmega2560 (d) ATmega328p	1	1	1	3	1
	iii.	How do you define a digital pin as output in Arduino? (a) pinMode(pin, INPUT); (b) pinMode(pin, OUTPUT); (c) digitalWrite(pin, OUTPUT); (d) digitalRead(pin, INPUT);	1	1	1	3	1
	iv.	Which of the following is the default extension for Arduino sketches? (a) .c (b) .cpp (c) .ino (d) .hex	1	1	1	3	1
	v.	Which Arduino function is used to generate a time delay? (a) delay() (b) millis() (c) micros() (d) timer()	1	1	1	3	1

			Marks				
vi.	How many segments are present in a 7-segment LED display? (a) 6 (b) 7 (c) 8 (d) 9	**1**	1	1	3	1
vii.	Which microcontroller is commonly used in IoT for robotics and automation? (a) ESP32 (b) ATmega328 (c) STM32 (d) PIC18F	**1**	1	1	2	1
viii.	What is the primary difference between LAN and WAN? (a) LAN covers a larger area than WAN (b) WAN covers a larger area than LAN (c) Both LAN and WAN are the same (d) WAN uses WiFi, whereas LAN does not	**1**	1	1	4	1
ix.	What is the primary purpose of the GET method in HTTP? (a) To send data securely (b) To retrieve data from the server (c) To delete data from the server (d) To update server resources	**1**	1	1	4	1
x.	API keys are primarily used for: (a) Authenticating and securing API access (b) Debugging server scripts (c) Monitoring server memory (d) Configuring hardware settings	**1**	1	1	4	1

Q.2	i.	Write an application where PWM is used and explain its role in the system.	**2**	1	1	3	1
	ii.	List the key differences between microprocessor and microcontroller with examples.	**3**	1	1	2	1
	iii.	Explain the Von Neumann and Harvard architectures in microcontrollers.	**5**	2	1	2	1
OR	iv.	Write Arduino Boards Pin functions.	**5**	2	1	2	1

Q.3	i.	What is the role of the setup () and loop () functions in an Arduino sketch?	**2**	2	1	3	1
	ii.	Explain PWM and how to create different brightness levels for an LED.	**8**	2		3	1

OR	iii.	Write the Arduino code snippet to blink an LED connected to digital pin 13 with a delay of 1 second.	**8**	3	1	3	1
Q.4	i.	Explain the difference between analogRead() and analogWrite() functions in Arduino.	**3**	2	1	3	1
	ii.	Describe the wiring and working of interfacing a push-button switch with an Arduino.	**7**	2	3	3	1
OR	iii.	Write the Arduino function to display the digit "2" on a common-cathode 7-segment LED.	**7**	3	1	3	1
Q.5	i.	Explain different IPV4 Classes.	**4**	2		4	1
	ii.	Briefly describe the architecture of the ESP32 microcontroller.	**6**	2		4	1
OR	iii.	Explain the following networking devices in detail. (a) Switch (b) Router (c) Bridge	**6**	2	1	4	1
Q.6		Attempt any two:					
	i.	How does the POST method differ from the GET method in PHP scripts?	**5**	2	1	5	1
	ii.	Briefly describe the network architecture of a cloud server.	**5**	2	1	5	1
	iii.	Explain the MQTT and HTTP protocols in IoT applications.	**5**	2	1	5	1

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Marking Scheme
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Q.1	i)	a) Generating analogy signals	**1**
	ii)	d) ATmega328p	**1**
	iii)	c) digital Write (pin, OUTPUT)	**1**
	iv)	c). ino	**1**
	v)	a) delay ()	**1**
	vi)	b) 7	**1**
	vii)	a) ESP32	**1**
	viii)	b) WAN covers a larger area than LAN	**1**
	ix)	b) To retrieve data from the server	**1**
	x)	a) Authenticating and securing API access	**1**

Q.2	i.	1 marks application of PWM + 1 mark explain its role in the system.	**2**
	ii.	0.5 marks for each difference	**3**
	iii.	2.5 marks Von Neumann + 2.5 marks Harvard architectures in microcontrollers.	**5**
OR	iv.	Write Arduino Boards Pin functions. (0.5marks for each pin)	**5**

Q.3	i.	0.5 marks for each difference role of the setup () and loop ()	**2**
	ii.	4 marks for PWM + 4 marks for brightness levels for an LED	**8**
OR	iii.	4 marks for void + 4 marks for loop	**8**

Q.4	i.	1.5 marks for each difference	**3**
	ii.	Diagram 2 marks + 5 marks for program	**7**
OR	iii.	3.5 marks for declaration + 3.5 marks for program	

Q.5	i.	1 mark for each class	**4**
	ii.	3 marks for diagram + 3 marks for explanation	**6**
OR	iii.	2 marks for each device	**6**

Q.6			
	i.	Difference between Post & GET 2.5 marks for each	**5**
	ii.	Diagram marks 2.5 + 2.5 explanation	**5**
	iii.	2.5marks for MQTT + 2.5 for HTTP	**5**

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