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ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. / B. Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, NOV/DEC 2023

Information Technology

VI Semester

IT5601 Embedded Systems And Internet Of Things

(Regulation 2019)

Time: 3hrs

Max.Marks: 100

CO 1	Understand and Compare Various Embedded Processor
CO 2	Design and deploy timer and Interrupts
CO 3	Write an Embedded C Program
CO 4	Design a simple Embedded Application
CO 5	Design portable IoT application using Arduino/Raspberry Pi/ Open Platform
CO 6	Analyze application of IT in real time Scenario

BL – Bloom's Taxonomy Levels

(L1 - Remembering, L2 - Understanding, L3 - Applying, L4 - Analysing, L5 - Evaluating, L6 - Creating)

PART- A (10 x 2 = 20 Marks)

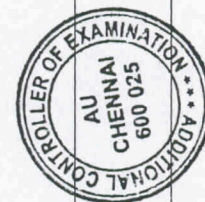
(Answer all Questions)

Q. No	Questions	Marks	CO	BL
1	Write the frame format of PCON register. How does it affect baud rate?	2	CO1	L3
2	What is machine cycle frequency in 8051? How is it used by the UART?	2	CO1	L3
3	Shows the interconnections for 4K ROM as program memory with 8051	2	CO2	L3
4	Compare memory and I/O mapped mapping.	2	CO2	L3
5	Write the syntax of digitalWrite function in Arduino	2	CO5	L3
6	Why is preemptive scheduling required in RTOS	2	CO4	L2
7	Draw the protocol stack of IoT	2	CO6	L1
8	What are the packages required for interfacing Pi with a camera module?	2	CO5	L1
9	List the sensor that can be used in air pollution monitoring.	2	CO6	L1
10	Differentiate Embedded system with respect to IoT with an example.	2	CO6	L2

PART- B (5 x 13 = 65 Marks)

Q. No	Questions	Marks	CO	BL
11 (a) (i)	Explain the different addressing modes in 8051 assembly language program: Give example for each of them.	10	CO2	L3
(ii)	Explain the Ram allocation in 8051 and how does the program status word influences the usage of RAM.	3	CO1	L2
OR				
11 (b) (i)	Explain the architecture of 8051. Compare microcontroller with general purpose microprocessor	13	CO1	L2
12 (a) (i)	Write an embedded C program: To find the sum of mod 5 numbers in an	10	CO3	L3

	array. Assume the array starts at location 5000H and has N elements																			
(ii)	Explain the usage of register select pin in LCD device interfacing.	3	CO2	L3																
OR																				
12 (b) (i)	Explain priority based scheduling. Schedule the following task set with fixed priority and dynamic priority algorithms (p1,p2,p3 priority order) Schedule it for a hyper periods.	13	CO4	L3																
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>PID</th> <th>Release time</th> <th>CPU time</th> <th>Period</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>1</td> <td>1</td> <td>4</td> </tr> <tr> <td>P2</td> <td>2</td> <td>2</td> <td>8</td> </tr> <tr> <td>P3</td> <td>3</td> <td>3</td> <td>12</td> </tr> </tbody> </table>	PID	Release time	CPU time	Period	P1	1	1	4	P2	2	2	8	P3	3	3	12			
PID	Release time	CPU time	Period																	
P1	1	1	4																	
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P3	3	3	12																	
13 (a) (i)	A smart computer lab monitoring the temperature , number of students, power usage of the lab is to be implemented. Design and explain a level-6 IoT framework connecting the sensing and actuation devices to the cloud. Write an Arduino sketch for the monitoring the patient.	13	CO5	L3																
OR																				
13 (b) (i)	Explain the block diagram of ARM processor.	7	CO1	L3																
(ii)	Compare ARM and Thumb instruction set. Which one would be feasible for a low power personal device.	6	CO1	L2																
14 (a) (i)	Design and develop a simple IoT device for tracking the entry and exit of Knowledge park, Deploy a ID card reader system for both staff and student to monitor the usage of class room with minimal hardware using RASPBERRY Pi. Show the pin connection diagram for the same.	13	CO5	L3																
OR																				
14 (b) (i)	An embedded application with IoT for object tracking, extrapolation of location based on history and sensing inputs is developed. Explain the implementation of this prototype. Explain how WIFI and GPS helps in the implementation of the model.	13	CO5	L3																
15 (a) (i)	Design and develop a smart irrigation IoT device to water the rice crop during various phases of its growth. Assume suitable sensors and motor devices.	13	CO6	L3																
OR																				
15 (b) (i)	Design and develop a smart car parking system to monitor the unauthorized entry of vehicles in the campus. Assume suitable sensors and motor devices.	13	CO6	L3																



PART- C (1 x 15 = 15 Marks)

(Q.No.16 is compulsory)

Q. No	Questions	Marks	CO	BL
16. (i)	A Clothing fashion store is developing a smart mirror which can project the suitability of a wardrobe under different gradients of light (timing in the day) and environmental factors to predict the suitability of a dress. Design a IoT application to interface the smart mirror with the smart wardrobe and suggest the choice of clothing to the user, Assume the	15	CO6	L3