Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2026

Sixth Semester

Artificial Intelligence and Data Science

CS3691- EMBEDDED SYSTEMS AND IOT

(Common to Computer Science & Engineering)

Regulations - 2021

Duration : 3 Hrs ***Maximum : 100 Marks***

PART – A(ANSWER ALL QUESTIONS) (Marks 10*2=20)

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	List the on-chip peripherals of 8051 microcontroller.	L1	1	2
2.	A given 8051 chip has a speed of 16MHz.What is the range of frequency that can be applied to the XTAL 1 and XTAL 2 pins?	L2	1	2
3.	Write an 8051 embedded C program to read a byte of data from port0. If it is less than 50, send it to port1; or else send it to port 2.	L2	2	2
4.	Define the term kernel in RTOS.	L1	2	2
5.	What is sketch in Arduino?	L1	3	2
6.	Differentiate sensor with transducer.	L2	3	2
7.	What is name of protocol which having this standard of IEEE 802.15.4?	L1	4	2
8.	A Zigbee transmitter sends a signal at a frequency of 2.450 GHz. Calculate the wavelength of the signal.	L2	4	2
9.	Define embedded system design in the context of IoT applications.	L1	5	2
10.	Interpret the function of an actuator in a smart irrigation system.	L2	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	Sketch the functional block diagram of 8051 micro controller with its DIP pin diagram	L2	1	10
		ii	A square wave of frequency 1KHz has to be generated. Using timer1 in mode1, on Pin P1.2. Find the value of count to be loaded into TH1 and TL1 registers. Assume XTAL frequency is 11.0592 MHz.	L1	1	6
			Or			
	b	i	Explain the various interrupt handling methods in 8051 and also classify the types relevant to software interrpt.	L2	1	10
		ii	Calculate the time taken to transmit one full character frame (1 start bit, 8 data bits, and 1 stop bit) at a 4800 baud rate. Also, find how many such characters can be transmitted per second using the 8051 microcontroller.	L1	1	6
12.	a		Interface a 32KB external EPROM and a 32KB external RAM with the 8051 microcontroller. Construct the circuit diagram and calculate the starting and ending addresses of the external memory units.	L3	2	16
			Or			
	b		Given a set of 4 processes with arrival times and burst times as follows: P1: Arrival = 0 ms, Burst = 8 ms P2: Arrival = 1 ms, Burst = 4 ms P3: Arrival = 2 ms, Burst = 9 ms P4: Arrival = 3 ms, Burst = 5 ms If preemptive priority scheduling is used and priorities are assigned as P1=2, P2=1, P3=4, P4=3 (lower number = higher priority), Solve for the average waiting time and turnaround time.	L3	2	16

13.	a	Describe the basic configuration of an IoT system and the role each component.	L2	3	16
		Or			
	b	Analyze how Arduino can be used to read input from sensors and produce output through actuators.	L2	3	16
14.	a	Evaluate the strengths and limitations of Bluetooth, WiFi, and ZigBee for implementing an IoT-based smart home system. Justify your choice of communication protocol.	L5	4	16
		Or			
	b	Assess the role of Raspberry Pi as an open platform in IoT projects. How does it compare with other development boards in terms of scalability and ease of integration?	L5	4	16
15.	a	Build a simple IoT-based home automation system to control lighting and temperature using embedded sensors and actuators. Explain how the system would be set up, including communication protocols, data flow, and user interface.	L3	5	16
		Or			
	b	Develop a solution using IoT for smart agriculture to monitor soil moisture, temperature, and crop health. Describe how the collected data would be processed, analyzed, and used for automated irrigation, and how it would communicate with other systems for remote management.	L3	5	16

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