


## KEY

 <b>VIT</b> Vellore Institute of Technology <small>(Deemed to be University under section 3 of the UGC Act, 1956)</small>		<b>Final Assessment Test – Winter 2023-24 Semester - May 2024</b>				
Emp Id: 10454		Course code : BCSE305L	Slot: A2+TA2			
		Course Title : Embedded Systems	Time: <b>Three Hours</b>			
		Course Mode : CBL	Max. Marks: <b>100</b>			
		Faculty Name : M.Narayana Moorthi	School: SCOPE			
		Class Number(s): Common to all A2+TA2 slots	Mobile No.: 9385448385			
<b>KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE</b>						
<b>Answer any TEN Questions (10 X 10 = 100 Marks)</b>						
Sl. No:	Questions Text	E/A/ T	Unit / Module No	Marks	BL	CO
1.	<p>Draw the block diagram of an embedded system and compare and contrast Microprocessor and Microcontroller? Explain the architecture of 8051 Microcontroller with neat sketch?</p> <p>Power supply-ram-rom-timers-GPIO ports- diagram  Tabulation about microprocessor and microcontroller-general external– single chip – internal—  8051 features- architecture diagram  History- intel 1982- 8 bit – size of ram / rom-16 bit timers  Registers – A/B – R0-R7 / SFR--</p>	E	1	10	1	1
2.	<p>What is watch dog timer? Identify any 5 applications of timers and counters and discuss the working of timers and counters. Write a program for the following?  To generate a rectangular waveform of on time 25ms and off time 10mses. Write an 8051 C program to toggle only pin P1.5 continuously every 250msec. Use timer 0, mode2 to create the delay?</p> <p>Timers- counters – applications- like- washing machine-projector- cell phone- traffic signal – alarm clock--- about watch dog timer- TMOD-TCON fields- working principles-  8051 port interface diagram to generate waveform with required time and toggle pin</p>	A	2, 7	10	2	2
3.	Briefly discuss the design process of an Embedded System namely <b>“ATM”</b> with the following illustrations?	T	3	10	3	2

	<p>(a) Identify the H/W and S/W Components?  (b) Discuss the working principle and design process with neat sketch?</p> <p>About ATM  Block diagram  Hardware components list  Software modules  Working - descriptions</p>																	
4.	<p>Briefly discuss about the embedded programming development tools and discuss in detail about the code optimization techniques with an example to each?</p> <p>IDE- 8051-KEIL –  Assembler/ compiler – debugging / host / target devices --- discussions  Code optimization – benefits- examples- like loop optimization – expression simplification --- procedure in lining ---</p>	A	4	10	4	3												
5.	<p>List any 5 hard and soft real time systems. Compare and contrast RMS from EDF?  Schedule the following task table using RMS?</p> <table border="1"> <thead> <tr> <th>Task</th> <th>Period</th> <th>Execution Time</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>3</td> <td>1</td> </tr> <tr> <td>P2</td> <td>5</td> <td>3</td> </tr> <tr> <td>P3`</td> <td>6</td> <td>1</td> </tr> </tbody> </table> <p>Example embedded systems  Tabulation  Utilization  Hyper period  Timeline graph – scheduling descriptions</p>	Task	Period	Execution Time	P1	3	1	P2	5	3	P3`	6	1	T	5	10	5	4
Task	Period	Execution Time																
P1	3	1																
P2	5	3																
P3`	6	1																
6.	<p>What is the interpretation of embedded networking protocols? Explain in detail the working of CAN bus architecture?  Diagram  Discussion</p>	E	6	10	1	3												
7.	<p>State the design challenges and characteristics of an embedded system? Draw the schematic diagram and write an embedded program using 8051 for the following:  A door sensor is connected to the P1.1 and buzzer is connected to P1.7. Monitor the door sensor and when it opens, sound the buzzer?</p>	A	7	10	2	1												

	Power , memory , size , cost --- Diagram Program code either assembly or embedded c					
8.	List any 10 sensors and actuators with their specifications and characteristics. Write the features of PIC microcontroller?  Features of PIC microcontroller List of sensors – temperature- pressure – humidity - --- LED-LCD-Motors – specifications- characteristics -	A	2	<b>10</b>	<b>3</b>	
9.	Draw the CDFG for an embedded application namely fire alarm system.  About fire alarm system – block diagram – pseudo code- Code- CDFG illustration	E	4	<b>10</b>	<b>4</b>	<b>3</b>
10.	Describe the features of handheld devices using ARM processor.  ARM processor – registers- instruction sets – about handheld devices- example add/sub/mul/div with diagram--	T	3	<b>10</b>	<b>5</b>	
11.	What is UART? Write a program for 8051 to transfer the data “EXAM” serially at 9600 baud, 8 bit data, and 1 stop bit.  Serial port – SCON / SBUF / program either assembly or embedded c	E	2	<b>10</b>	<b>1</b>	<b>4</b>
12.	Explain the memory interfacing techniques using encoders and decoders. Memory types – about decoder- encoder – interface diagram – memory mapping concepts -	A	2	<b>10</b>	<b>2</b>	<b>3</b>
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