

Enrolment No:



**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

**End Semester Examination, December 2021**

**Course: Microprocessor & Embedded Systems**

**Semester: V**

**Program: B. Tech CS-BAO,GG, IFM,CCVT**

**Time 03 hrs.**

**Course Code: CSEG3018**

**Max. Marks: 100**

**Instructions:**

1. Attempt all the questions (Theory, Numerical, Case study etc.) on A4 size blank sheets.
2. Attempt all questions serially as per question paper.
3. Answer should be neat and clean. Draw a free hand sketch for circuits/tables/schematics wherever required.
4. You are expected to be honest about each attempt which you make to progress in life

**SECTION A (5 X 4 = 20 Marks)**

S. No.	Answer all questions	Marks	CO
Q 1	What is the difference between pull-up and pull-down resistors used in I/O ports of 8051?	4	CO5
Q 2	Why hardware software co-design is always advised in the design of embedded Systems compared to traditional design approaches	4	CO4
Q 3	Highlight the main differences between encoder and multiplexer. Also explain how an encoder can be used as a multiplexer	4	CO1
Q 4	With an example explain race around condition and the use of edge triggering in flip-flops to remove the effect of race-around condition.	4	CO1
Q 5	While interfacing LCD with 8051, explain the use of RS and E signals	4	CO4

**SECTION B ( 4 X 10 = 50 Marks)**

Q 6	For 8085 microprocessor system interface 16KB of EPROM and 4KB of RAM using two 8KB of EPROM and two 2KB of RAM.	10	CO3
Q 7	If the task is to design an Engine Control Unit (ECU) of a very high end vehicle, as an electronic engineer which device will you choose between a) microprocessor and b) microcontroller and why? Justify your response with suitable block diagrams of both explaining the function of each block.	10	CO5
Q 8	Interface 8 LEDs to PORT0 of 8051 microcontroller and write the C code to display following patterns i) ODD ON/OFF ii) EVEN LEDs ON/OFF iii) Converge and Diverge without overlap iv) Curtain Effect	10	CO4

	Provide a delay of 1 second between each pattern. Draw the schematic of complete set-up along with the code and flowchart.																
Q 9	<p>Write 8085 program to generate continuous square wave with period of 500<math>\mu</math>S. Assume system clock frequency to be 6kHz. Write the algorithm or draw the required flowchart.</p> <p style="text-align: center;"><b>OR</b></p> <p>Write a program to count 0 to 5 with a one-second delay between each count, the counter should reset itself to 0 at the end of count 5 and repeat sequence continuously. Use register pair HL to set up delay and clock frequency of 1MHz</p>	<b>10</b>	<b>CO2</b>														
<b>SECTION C ( 2 X 20 = 20 Marks)</b>																	
Q 10	<p>I. Design an Analog-to-Digital converter system using 8051 controller. Use ADC0804, 8-bit single channel, parallel A-to-D converter. The 8-bit digital data to be read on P1 has to be converted to its ASCII form and sent to the LCD connected at P3. Write the C program for the whole logic and draw the complete flowchart.</p> <p>II. Write a program to find the smallest number in an array of data using 8085 instruction set. Use the following data:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Data</th> <th>Memory Address</th> </tr> </thead> <tbody> <tr> <td>39</td> <td>2501</td> </tr> <tr> <td>94</td> <td>2502</td> </tr> <tr> <td>1F</td> <td>2503</td> </tr> <tr> <td>EB</td> <td>2504</td> </tr> <tr> <td>A8</td> <td>2505</td> </tr> <tr> <td>0A</td> <td>2506</td> </tr> </tbody> </table>	Data	Memory Address	39	2501	94	2502	1F	2503	EB	2504	A8	2505	0A	2506	<b>10+</b> <b>10</b>	<b>CO 5</b>
Data	Memory Address																
39	2501																
94	2502																
1F	2503																
EB	2504																
A8	2505																
0A	2506																
Q 11	<p>I. A doorbell sensor is connected at P2.1 and a buzzer at P1.1 of 8051 microcontroller. Write a C program, algorithm and draw the flow chart to monitor the sensor continuously and sound the buzzer whenever the door bell is pressed. Assume suitable delay.</p> <p>II. In 8085, divide the interrupts with respect to</p> <ol style="list-style-type: none"> <li>i) Software vs hardware interrupts</li> <li>ii) Edge vs Level triggered interrupts</li> <li>iii) Highest to Lowest priority interrupts</li> <li>iv) Maskable and Non-maskable interrupts</li> <li>v) Vectored and Non-vectored interrupts</li> </ol> <p>Also calculate the addresses of all the vectored interrupts</p>	<b>10 +</b> <b>10</b>	<b>CO4</b>														