Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2021

Programme Name: B. Tech- CSE (Big Data, Dev operations, O&G, AIM, IOT, CSF, OSSOS) **Semester : VI**
Course Name : Microprocessor & Embedded Systems **Time : 03 hrs**
Course Code : CSEG 3018 **Max. Marks: 100**
Nos. of page(s) : 02
Instructions: Assume any data in programming, if required

SECTION-A (6 x 5 = 30 Marks)

S. No.	Attempt ***all*** the questions	**Marks**	**CO**
Q.1	Distinguish between combinational and sequential switching circuits. Explain the working and truth table of full substractor.	**5**	**CO1**
Q.2	Write the role of the followings pins of 8085 microprocessor ALE INTR TRAP SID CLK(OUT)	**5**	**CO2**
Q.3	A switch is connected to P1.7. Write Embedded 'C' program to check the status of switch and perform the following 1. if switch = 0, send letter "N" to P2. 2. if switch = 1, send letter "Y" to P2. **OR** Write an assembly language/embedded 'C' program for the Eight LED blinking in alternate way connected to port P1 of 8051 microcontroller.	**3 + 2**	**CO5**
Q.4	Illustrate the followings for 8085 processor with examples? (a) Hardware and software interrupts (b) Maskable and non-Maskable interrupts	**5**	**CO1**
Q.5	Define Embedded system. Discuss the challenges and future trends in embedded system	**5**	**CO5**
Q.6	Write 8085 assembly program to multiply two 8 bit numbers stored in memory locations 6500H and 6501H. Check for final carry, if carry is 1 then store 0 in register C or else store 0. Store the result of multiplication and carry in 7000H and 7001H respectively? Assume the numbers	**5**	**CO4**

SECTION-B (5 x 10 = 50 Marks)

	Attempt ***all*** the questions		
Q.7	What are the different types of the flip-flops? Write the detailed working of J-K flip flop using NAND and NOR with truth table/characteristic table and characteristics equation	**10**	**CO1**
Q.8	Write the C code for interfacing 7-segment display with 8051 microcontroller. The count of 0 to 9 should be displayed with a delay of 1 second. Connect to switch to P1.1 which when pressed should reset the count and start from 0 again. Write the algorithm(or draw the flowchart) and draw the schematic	**10**	**CO4**

<table>
<tr><td>Q.9</td><td>Interface a 6264 IC (8K x 8) RAM chip with 8085 microprocessor using a NAND gate decoder such that the starting address assigned to the chip is 4000 H and explain its behavior.
OR
Write the format of assembly language program and flow chart to develop the code in assembly language programming</td><td>10</td><td>CO3</td></tr>
<tr><td>Q.10</td><td>(a) For a RAM Memory 64K x 8 RAM IC, Calculate the followings.
(i) No of Address lines
(ii) No of data lines
(iii) No of registers
(iv) No. of memory cells
(v) No of chips required using 8K x 8 RAM IC.

(b) Calculate the delay of the register pair with clock frequency of 3MHz
LXI B, 1000H 10 T-States
LOOP: DCX B 6 T-States
MOV A, C 4 T-States
ORA B 4 T-States
JNZ LOOP 7/10 T-States</td><td>5 + 5</td><td>CO2</td></tr>
<tr><td>Q.11</td><td>Detail the different types of addressing modes of 8051 microcontroller with examples.</td><td>10</td><td>CO4</td></tr>
<tr><td colspan="4">SECTION-C (1 x 20 = 20 Marks)
Attempt any one of the followings</td></tr>
<tr><td>Q.12</td><td>(a) Calculate the time required to execute the instruction LXI A, F045h, if the clock frequency is 3 MHz, also explain its timing diagram with the following data shown in table 1.
Table 1 LXI instruction,

<table><tr><th>Address</th><th>Mnemonics</th><th>Opcode</th></tr><tr><td>A000h</td><td rowspan="3">LXI A, F045h</td><td>21</td></tr><tr><td>A001h</td><td>45</td></tr><tr><td>A002h</td><td>F0</td></tr></table>
(b) Draw and explain the block diagram (decoder circuit) explain the generation of control signals. Also write its corresponding truth table</td><td>10

10</td><td>CO3</td></tr>
<tr><td></td><td>OR</td><td></td><td></td></tr>
<tr><td>Q.12</td><td>(a) Highlight the importance of CGRAM, DDRAM memories while interfacing LCD with 8051. Also comment on the usage and working of RS and E pin of LCD. Interface the LCD to 8051 microcontroller and write the program to display on 16 x 2 LCD “I LOVE UPES”

(b) Detail the completed internal RAM memory architecture of 8051 with complete description of register banks, bit Addressable RAM allocation and SFR.</td><td>10 +10</td><td>CO3</td></tr>
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