

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, April/May 2018

Course: Embedded Systems
Program: B. Tech Mechatronics
Time: 03 hrs.

Semester: IV
Max. Marks: 100

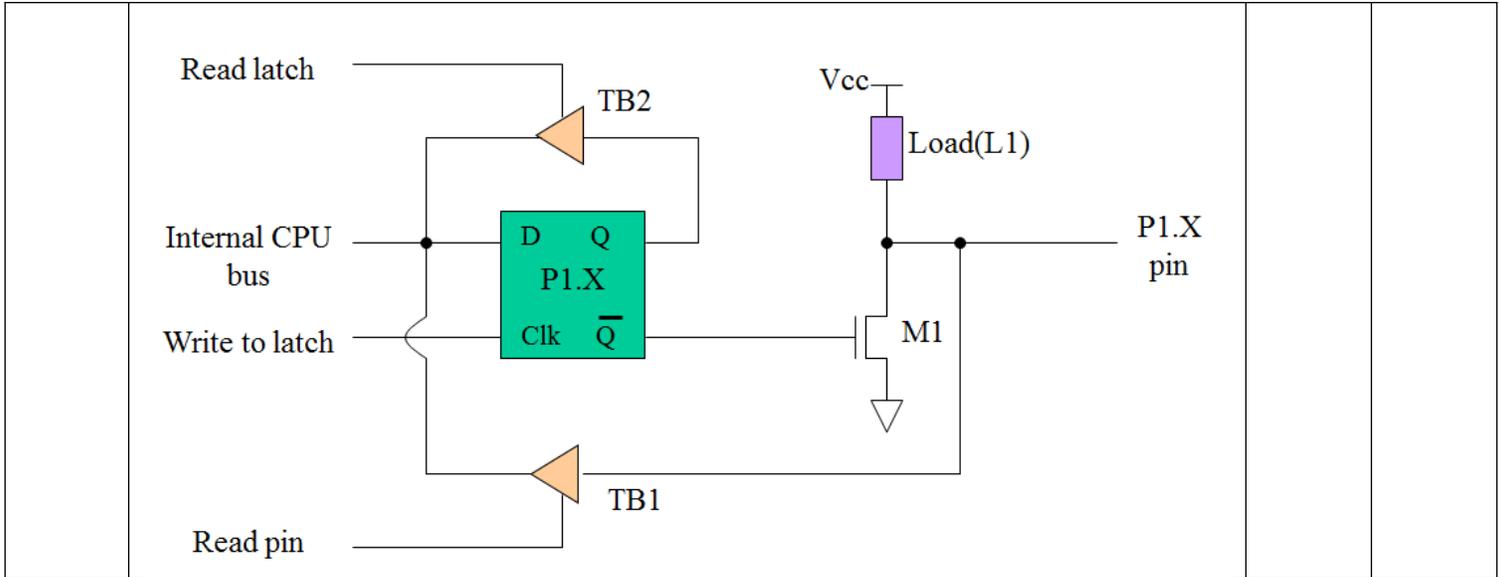
Instructions: For every assembly and C code mention the comments of each instruction.

SECTION A

S. No.	Answer all the questions	Marks	CO
Q1	Various microcontrollers are available in the market, what are the things which one should keep in mind before purchasing the microprocessor for an application.	4	CO4
Q2	<p>Explain the function of the following program:</p> <pre> Program: MVI A, BYTE1 ORA A JM OUTPRT OUT 01H HLT OUTPRT: CMA ADI 01H OUT 01H HLT </pre> <p>In the above program if BYTE1 = A7H, what will be displayed at port 01H?</p>	4	CO1
Q3	Load the bit pattern 91H in register B and 87H in register C of 8085 microprocessor. Mask all the bits except D ₀ from register B and C. If D ₀ is at logic 1 in both registers, turn on the light connected to the D ₀ position of output port 01H; otherwise, turn off the light.	4	CO2
Q4	Elucidate the advantage of pipeline architecture utilized in 8086. Highlight the differences between 8085 & 8086 microprocessors.	4	CO3
Q5	Write 8085 assembly language program to subtract two 8-bit numbers ABH and 79H using only two instructions. Mention the result and status of flags.	4	CO2

SECTION B

S. No.	Answer any four questions	Marks	CO
Q6	If the task is to design an Engine Control Unit (ECU) of a very high end vehicle which works on RTOS, as a mechanical engineer which device will you choose between a) microprocessor and b) microcontroller and why? Justify your response with suitable generalized block diagrams of both explaining the function of each block.	10	CO5
Q7	In 8051 write a C code to connect 7-segment display system which should two 7-segment to display the count 100 ticks from 00 to 99 in an incremental manner.	10	CO4
Q8	The hardware structure of an I/O pin of 8051 is given in the figure below. Explain the complete architecture and explain the step by step process of i) Writing 1 and 0 to pin P1.X ii) Reading High and Low at input pin P1.X	10	CO6



Q9	Draw the internal architecture of 8051 microcontroller and explain the function of each block.	10	CO6
Q10	<p>To convert temperature from Fahrenheit to degree Celsius the equation used is</p> $C = \frac{5}{9}(F - 32)$ <p>Write an assembly language program for 8086 along with algorithm to implement the above mentioned equation.</p>	10	CO5

SECTION-C

S. No.	Answer any two questions	Marks	CO
Q11	Design a decoder and memory interface system for 8085 microprocessor to connect 32kB of EPROM using 8kB of EPROM and 32kB of RAM using 8kB of RAM.	20	CO3
Q12	Consider two 64-bit numbers given below	20	CO5

	<p>i) 1234567890ABCDEF H ii) 985401AD77654321 H</p> <p>Design an adder system for 8086 processor by writing the code in assembly language for adding both the numbers. Draw the flow chart of the adder and write its algorithm. Comment on the result obtained.</p>		
Q13	<p>Design a networked embedded notice board system system using 8051 that can display the message “MECHATRONICS” in the first line and “UPES” in the second line of LCD with the following assumptions</p> <p>i) Connect Port 0 of 8051 to data pins of LCD ii) Connect Port 2 of 8051 to control pins of LCD</p> <p>Write the C program along with algorithm.</p>	20	CO6

<p>Name:</p> <p>Enrolment No:</p>	
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