Name:

Enrolment No:

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2020

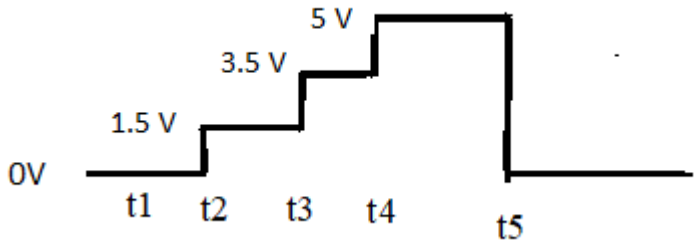
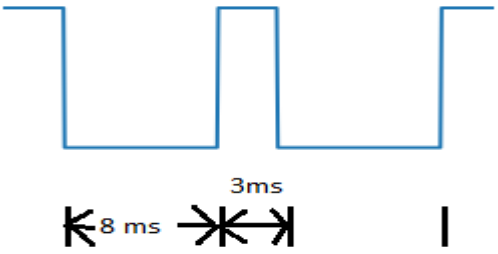
Course: Embedded system (ECEG 2003) **Semester: V**
Programme: B. Tech (Mechatronics) **Time: 03 hrs.**
Max. Marks: 100
Instructions: All Section are compulsory and detailed description is required on every line of code.

SECTION A

S. No.		Marks	CO
Q 1	Write short note on following: a) PUSH and POP b) ISR in 8051	**5**	**CO3**
Q 2	Explain all general purpose and Special purpose registers used in 8051 microcontroller.	**5**	**CO5**
Q 3	Write assembly level program (ALP) to exchange the content of register. Before Execution: R1 = 05 H, R2 = 06 H After Execution: R1 = 06 H, R2 = 05 H	**5**	**CO3**
Q 4	Define vectored, non-vectored, maskable and non maskable interrupt. What is vectored address for all the interrupt of 8051 microcontroller?	**5**	**CO2**
Q 5	Assuming XTAL = 16MHz, Find the TH1 and TL1 value to generate a time delay of 5ms. Timer 1 is programmed in mode 1 operation.	**5**	**CO4**
Q 6	Explain the usage of long jump (LJMP) and short jump (SJMP) in 8051 microcontroller.	**5**	**CO2**

SECTION B

Q 6	a) Write an ALP to find division of two 8 bit numbers. b) Write an ALP to find multiplication of two 8 bit numbers.	**10**	**CO1**
Q 7	Explain TMOD, PSW,IE and TCON Register Instruction. With eample expalin its usage technique.	**10**	**CO3**

<table>
<tr><td>Q 8</td><td>Write ALP to generate following waveform from Port A.
<table><tr><td>t1</td><td>0m Sec</td></tr><tr><td>t2</td><td>1m Sec</td></tr><tr><td>t3</td><td>2m Sec</td></tr><tr><td>t4</td><td>3m Sec</td></tr><tr><td>t5</td><td>4m Sec</td></tr></table> 
Hint: For 5V assume FF H and 0V assume 00H, accordingly select suitable value for above diagram.</td><td>10</td><td>CO5</td></tr>
<tr><td>Q 9</td><td>Write an ALP to convert hexadecimal number to decimal number.</td><td>10</td><td>CO4</td></tr>
<tr><td>Q 10</td><td>Write an ALP to create a square wave with an ON time of 2ms and OFF time of 8ms on all pin of port 0. Assume crystal oscillator is 12 MHz shown below
  </td><td>10</td><td>CO4</td></tr>
<tr><td colspan="4">SECTION C</td></tr>
<tr><td>Q 11 A</td><td>Given a series of number, calculate the sum of the even number only. The length of the series is available in memory location 9000H. The series begins at 9001H. Ignore the carry in the program. Assume that the sum is only eight bit long and store it in memory location 9100H.</td><td>10+10</td><td>CO5</td></tr>
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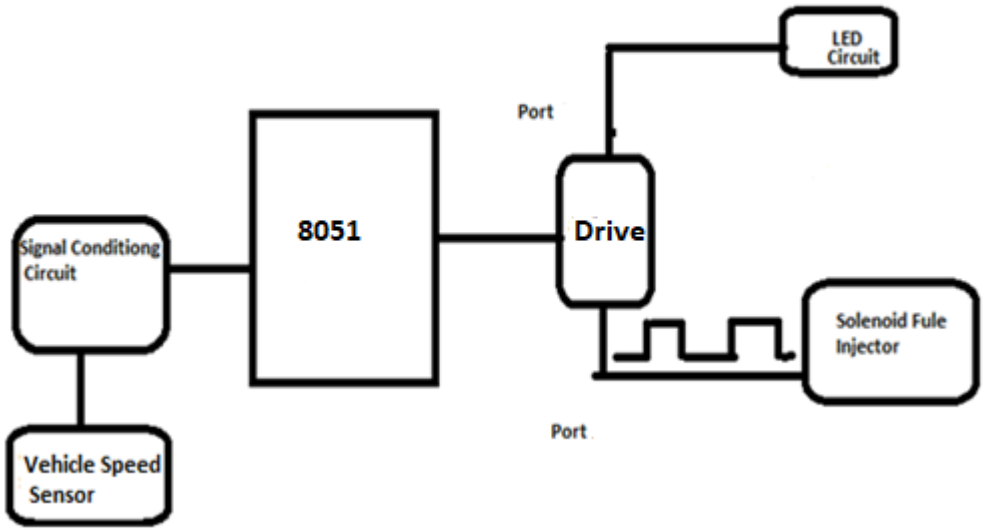
Q 11 B	Embedded System Developers needs to be aware of the four main pillars for development. With neat diagram, explain the system. Also explain the tools/Hardware/software used in the embedded system development.		
Q 11	**OR** Assume 8051 Intel microcontroller connected with Solenoid Fuel Injector and LED shown in below figure. When Vehicle speed goes above from maximum specified limit, a LED which is connected to output Port must be ON for 2m Seconds in order to indicate Vehicle is moving above specified maximum Limit. Also another task is to send square wave on output port B continuously. LED need 5V to ON whereas Injector need Square wave of 5V with 75 % duty Cycle at 1 KHz frequency. Write ALP and ISR to meet above condition.  Note: Assume any interrupt of 8051 microcontroller and accordingly write the code.	**20**	**CO5**