

Department of Electrical engineering
UET LHR FSD campus

Final Exam Date: 03-01-2022
Time: 90 minutes, Marks=40

EE-273 Microprocessor Systems
5th Semester (Session 2019)

Reg. No. 2019EE-383

Q1	<p>a) A timer is running from a clock frequency of 16 MHz. What would be the Resolution and Range of a 32-bit timer in seconds. Also draw the block diagram of the timer.</p> <p>b) Calculate the value of reload and match registers to generate 50 Hz PWM with 10% duty cycle. Also clearly mention whether 16 bit or 32 bit timer will be used.</p>	CLO4	<p>Cognitive</p> <p>Level 4</p> <p>PLO2</p>	06 + 04
Q2	Explain the use of pull-up and pull-down resistors.	CLO4	<p>Cognitive</p> <p>PLO2</p>	05
Q3	<p>Consider the assembly program given in the following listing. What will be the contents of registers R1 and R2 after the execution of the following program. Note that little endian memory format is used.</p> <pre> AREA MyMain, CODE, READONLY data DCD 0x87654321 EXPORT __main __main LDR R0, =data LDRSH R1, [R0, #1]! LDRSB R2, [R0, #2] Stop B Stop END </pre>	CLO3	<p>Cognitive</p> <p>Level 3</p> <p>PLO5</p>	05
Q4	<p>Design the following system.</p> <p>Use on-board user switch SW1 connected to PF4 by configuring PF4 as an external interrupt. The interrupt is generated on the falling edge, corresponding to the pressing of the switch. On every third key press an on-board LED (green color) connected to PF3 is toggled and also on every key press an on-board LED connected to PF2 is toggled. PORTF has an IRQ=30. Use a priority of 5.</p> <p>(registers used are given on back side)</p>	CLO3	<p>Cognitive</p> <p>Level 6</p> <p>PLO 5</p>	10
Q5	Calculate the value of UART_BAUD_INT_R and UART_BAUD_FRAC_R for a baud rate of 115200. Use HS-EN=1 and clock frequency of 16 MHz. Also plot a typical UART frame.	CLO4	<p>Cognitive</p> <p>PLO 2</p>	05
Q6	<p>Write C code to control the low fuel warning led of a car dashboard.</p> <ul style="list-style-type: none"> Port PA6 is connected to the low fuel switch that indicates whether the fuel is lower than a certain level. Port PF7 is connected to the warning indicator LED. <p>Your system is supposed to turn on the LED if the fuel is low.</p>	CLO3	<p>Cognitive</p> <p>Level 6</p> <p>PLO 5</p>	05

Register Addresses

GPIO Port A	0x40004000
GPIO Port B	0x40005000
GPIO Port F	0x40025000

Register	Offset
GPIO AFSEL	0x420
GPIO DEN	0x51C
GPIO DIR	0x400
GPIO PUR	0x510
GPIO PDR	0x514

Registers for Q#4

Register label	Address	Reset value	Brief description
GPIO PORTF_ISR	0x40025404	0x00000000	Interrupt sense register.
GPIO PORTF_IBELR	0x40025408	0x00000000	Interrupt on both edges register.
GPIO PORTF_IIEV_R	0x4002540C	0x00000000	Interrupt event register.
GPIO PORTF_IMLR	0x40025410	0x00000000	Interrupt mask register.
GPIO PORTF_RISR	0x40025414	0x00000000	Raw interrupt status register.
GPIO PORTF_MISR	0x40025418	0x00000000	Masked interrupt status register.
GPIO PORTF_ICR_R	0x4002541C	0x00000000	Interrupt clear register.