AMERICAN INTERNATIONAL UNIVERSITY – BANGLADESH (AIUB)
Faculty of Engineering
Department of Electrical and Electronic Engineering

Course/Lab Name: EEE4103 Microprocessor and Embedded Systems

Semester: Spring 2023-24 **Term**: Mid **Quiz**: 01M **Total Marks**: 10 **Time**: 20 Minutes

Question Mapping with Course Outcomes:

Item	COs	POIs	K	P	A	Marks	Obtained Marks
Q1-2	CO1	P.a.4.C.3	K4			2×5	
					Total:	10	

Student Information:

Student Name:	Solve Sheet			Section:	B
Student ID #:	Solve Sheet	Date:	12.02.2024	Department:	

1. If you want to make an LED of red color blink every 4 seconds while using an Arduino system frequency of 16 MHz using a timer to generate the delay without any application of the delay() function, which timer of the Arduino Uno is suitable for your application? You may use a pre-scaler value of ~~256~~ 1024. Determine the necessary register set-up required for the program. [5]

   Answer:
   Required delay = 4 s = 4000000 µs
   Given system frequency = 16 MHz
   So, clock period = 1/frequency = 1/16 MHz = 0.0625 µs
   As such, Timer Count = Required delay/(clock period×pre-scaler value) – 1
   = 4000000/(0.0625×1024) – 1 = 62500 – 1 = 62499
   But Timer 0 can count up to 256 and Timer 1 can count up to 65,536; so Timer1 is suitable for this application.

2. For the above program, correct the following setup function: [5]

```
void setup() {
                          OUTPUT
    pinMode(REDLED_PIN, INPUT);

    TCCR1A = 0x________________;  0x00  // Since Timer1 is used, so registers
    TCCR1B = 0x________________;  0x05  // are used in this program instead of
    TCNT1 = 0x_________________;  0x0000 // registers of Timer0.
}
```

   What should be the value in the blank space?

   Hints: Prescaler values and corresponding register contents.

CSx2	CSx1	CSx0	Prescaler
0	0	1	1
0	1	0	8
0	1	1	64
1	0	0	256
1	0	1	1024