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| AIUB | **American International University - Bangladesh (AIUB)**  **Faculty of Engineering**  **Department of Electrical and Electronic Engineering (EEE)** | | | |
| **Course Name:** | Microprocessor and Embedded Systems | **Course Code:** | EEE 4103 | |
| **Semester:** |  | **Term:** | Mid | |
| **Faculty Name:** | Md Sajid Hossain | **Assignment #:** | | 01 |

**Course Outcome Mapping with Questions**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Item** | **COs** | **POIs** | **K** | **P** | **A** | **Marks** | **Obtained Marks** |
| **Q1** | **CO2** | **P.a.4.C3** | **K4** | **P1, P3, P7** |  | **10** |  |

**Student Information:**

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| --- | --- | --- | --- |
| **Student Name:** |  | **Section:** |  |
| **Student ID #:** |  | **Department:** |  |

**Submission Information:**

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| --- | --- | --- | --- |
| **Submission Date:** |  | **Due Date:** | **14/06/2023** |
| **Student ID #:** |  | **Department:** |  |

**Marking Rubrics (to be filled by Faculty):**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Problem #** | **Excellent**  **[5]** | **Proficient**  **[4]** | **Good**  **[3]** | **Acceptable**  **[2]** | **Unacceptable**  **[1]** | **No Response**  **[0]** | **Secured Marks** |
| Detailed unique response explaining the concept properly and answer is correct with all works clearly shown. | Response with no apparent errors and the answer is correct, but explanation is not adequate/unique. | Response shows understanding of the problem, but the final answer may not be correct | Partial problem is solved; response indicates part of the problem was not understood clearly. | Unable to clarify the understanding of the problem and method of the problem solving was not correct | No Response/ (Copied/identical submissions will be graded as 0 for all parties concerned) |
| **1** |  |  |  |  |  |  |  |
| **Comments** |  | | | | | **Total marks (10)** |  |

**Question # 1:** Complete Table 1 after going through the datasheet of the specified microcontrollers.

**Table 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Specifications** | **ATMega328P** | **STM32F401RE** | **ATMega2560** | **PIC33FJ32GP302** |
| **Manufacturer Name** |  |  |  |  |
| **Number of pins** |  |  |  |  |
| **Processing Speed (MIPS)** |  |  |  |  |
| **Program flash memory (bytes)** |  |  |  |  |
| **Communication Interfaces** |  |  |  |  |

The unit prices of the above mentioned MCUs are as follows: (1 USD = 108.50 BDT)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **ATMega328P** | **STM32F401RE** | **ATMega2560** | **PIC33FJ32GP302** |
| **Price** | $2.70 | $4.10 | $18.86 | $4.02 |

X Company in Bangladesh is trying to develop an affordable shop security system and they have shortlisted the listed 4 MCUs as possible candidates for their system CPU. The required minimum specifications for their intended design for the CPU are given below:

|  |  |
| --- | --- |
| **Minimum Clock Speed** | 16 MHz |
| **Minimum SRAM** | 8 Kbytes |
| **Minimum ADC Resolution** | 10-bit |
| **Minimum Program Memory** | 32 KBytes |
| **Minimum Number of PWM Channels** | 5 |

Being a design engineer at X Company, you have been given the responsibility to select the most suitable IC from the list for the security system design. Please select an IC from the list to design an **affordable** system and justify your answer with proper reasoning.