BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination: Final | Semester: Fall 2023
Duration: 1 Hour 30 minutes | Full Marks: 30

CSE 360: Computer Interfacing

[Answer any 3 Questions out of 4]

Figures in the right margin indicate marks. [Each Question carries 10 Marks]

Name: ID: Section:

1. CO2 a) Suppose you want a fast and long-lasting memory for your device. **Name** the memory you would choose compared to the other memory and **discuss** your reasons. **1**

b) **Explain** the mechanism of how the key component of your chosen memory stores the written data and **discuss** which level of cell architecture (number of bits) of the key component you would use for it to last longer. **4**

c) **Discuss** how Garbage collection and Trim command reduces write amplification? **3**

d) **Explain** how seek time is different compared to latency? **2**

2. CO2 Two different sets of communication protocols are used to communicate between devices A, B, C and D. Where A and B are considered to be master devices while device C is considered to be a slave device and they transfer data in between them using only two wires. The other device D, communicates with device C through a different protocol where both devices D and C send/receive parallel data to and from the protocol interface. Between the two used protocols, only one of the protocols needs clock synchronization.

a) **Write** the name of the communication protocol used between D and C and **illustrate** the connection diagram between D and C with pin names of the receiving and transmitting modules and explain all the steps of the data packet flow to send the data “11000001”. **4**

b) **Write** the name of the communication protocol used between A and C. Assuming device A wants to send two 8 bit characters “10101010” and “11110000” to device C. **Discuss** the whole process of this data transmission using the communication protocol between A and C. Use an **Illustration** to support your answer. **5**

c) **Write** the advantage and disadvantage of using Daisy Chain configuration in SPI (Serial Peripheral Interface). **1**

3. CO4 Suppose while designing a project you're trying to interface a Matrix keyboard, to display the key that you're pressing onto it.

a) **Explain** the whole process of how your pressed button would be identified by the microcontroller. You may use assembly code instructions to support your argument. **4**

b) **Write** the types of internal registers that are used in a 16x2 LCD and **explain** the purpose of these registers. **2**

c) Suppose you now want to add a motor to your project. **Name** three categories of motors that you can find and **discuss** how they are different from one other. **4**

4. CO4 Suppose, you're about to build a health and safety management system for the entry points at the New Brac University campus, for the staff. Assuming your system works in 4 phases:

Phase 1: Detects a person as they approach the entry point, and turns on the system.
Phase 2: Checks if the staff has a suitable oxygen level or not.
Phase 3: Checks body temperature of the staff.
Phase 4: Checks if the UV ray intensity of the environment is at a suitable level.

a) For Phase 2 and Phase 3, **name** two suitable sensing devices and **explain** the working mechanism of your chosen devices. **3**

b) For Phase 1 **justify** your choice of sensor that can detect as a human approaches the entry point and **explain** its working principle thoroughly. **3**

c) For Phase 4 **state** which sensing device fits the description and **discuss** the working principle of the sensor in detail. **4**