B.Sc. Engg. CSE 1st Semester | 12 March 2019 (Morning)

# ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
## ORGANISATION OF ISLAMIC COOPERATION (OIC)
## Department of Computer Science and Engineering (CSE)

**MID SEMESTER EXAMINATION** | **WINTER SEMESTER, 2018-2019**

**DURATION: 1 Hour 30 Minutes** | **FULL MARKS: 75**

## CSE 4105: Computing for Engineers

**Programmable calculators are not allowed. Do not write anything on the question paper.**

There are **4 (four)** questions. Answer any **3 (three)** of them **including Question No. 4.**

Figures in the right margin indicate marks.

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1. a) Computer system has a memory hierarchy from registers to main memory and to secondary storage. Write or Draw the details of the memory hierarchy. Why is the memory hierarchy needed? 7

   b) Binary systems start with ***bit*** and then to ***byte*** and ***kilobyte*** and so on. Write all the quantities of the binary number systems and show their equivalence in decimal numbers. 6

   c) What are *Virus*, *Worm* and *Trojan Horse*. How can you be protected from those? 6

   d) A file has a permission 0755 (111 101 101 in binary) set by its owner. What does it imply? Which types of files have this sort or permission? 6

2. a) What is a firmware? What is its relation and difference with software? Mention 3 computer devices that use firmware and also mention the purpose of using the firmware. 4

   b) How does a keyboard work? 5+2
   Is it possible to have a personalized keyboard layout just by configuring it?
   Is it possible to extend the capability of a keyboard as an output device also?
   If you write yes for the two questions just above, justify your answers.

   c) You may feel that Operating System (*OS*) occupies the CPU all the time. Yet OS executes several programs simultaneously in a time shared system. 5
   How does the OS control the CPU for executing multiple programs in a time shared system?

   d) How does a laser printer work? 5

   e) Differentiate between Parallel and Distributed Computing. Categorize peer to peer computing and cloud computing as one of parallel or distributed system. 4

3. a) Define a number system. Why is binary number system studied widely for developing digital systems? 4

   b) Convert $(55)_{10}$ to a 6
      i. Base-4 number.
      ii. Base-5 number.

   c) What are the decimal values for the numbers $(2112)_3$ and $(775)_9$? 6

   d) Perform the following 2's complement arithmetic assuming 4-bit computer system: 9
      i. 5 - 2
      ii. -4 -3
      iii. 1-8

**(Mandatory to Answer)**

4. a) ***Block*** is the logical primitive for any *file system*. How is a ***block*** defined in *Hard Disk* and in Flash Memory Devices? Compare a logical *file system* with the cataloging system of a library. Quote appropriate technical terms related to file systems during the comparison. 6

   b) Write an algorithm to convert a decimal number $D$ to a base $B$ number system. 7

   c) Many students have a misconception that an Integrated Development Environment (IDE) generates the ***.exe*** and runs the file. Define the tasks of an IDE for developing a program/code. 6

   d) How is a c program converted to a ***.exe*** binary executable file. Write the use of assembler, linker and compiler in achieving this conversion. 6