# Written Assignment#3

**Instructions:**

1. Please write your name and roll clearly.
2. Write questions along with question numbers.
3. Hand written assignment will be given more marks than printed.
4. A reference link is given with some questions to take support.
5. Answer is normally present in given link but careful reading is required.
6. Total marks of this assignment is 20. Each question carries 4 marks except for first two questions.

# Question#1: [2 marks]

Consider the environment where many user-level threads are mapped to a single kernel thread (i.e., the many-to-one model). Describe a situation the one-to-one model outperforms this model.

# Question#2: [2 marks]

What are the two main functions of an operating system?

# Question#3: [4 marks]

What is multiprogramming, multitasking, multiprocessing, multithreading?

# Question#4: [4 marks]

What are Program Counter (PC), Stack Pointer (SP), and Program Status Word (PSW) registers and PCB pointer?

# Question#5: [4 marks]

Consider a system that has two CPUs and each CPU has two threads (hyperthreading). Suppose three programs, P0, Pl, and P2, are started with run times of 5, 10 and 20 mses, respectively. How long will it take to complete the execution of these programs (please discuss three different possibilities depending on different programs scheduled to run on different CPUs/threads), and what is the minimum execution time? Assume that all three programs are 100% CPU bound, do not block during execution, and do not change CPUs once assigned?

# Question#6 [4 marks]

Please list two disadvantages of a monolithic operating system structure and two advantages of a microkernel operating system structure.