Menoufia University
Faculty of Electronic Engineering
Computer Science & Engineering Dept.
Third Year – 2nd Semester
Examiner: Dr. Ramadan Gad

2018 - 2019

Mid-Term Exam
Subject: Parallel Processing. (CSE 321)
Exam Date: 1 / 4 / 2019
Allowed Time: 60 Minutes
Total Mark: 15 Marks
No. of Pages: 1

:Section ..... **:Name** .....

Answer all the following questions

First Question: (5 Marks)

a) **Define: CPI, Instruction Count (Ic), and Throughput rate.** *(3 Marks)*

b) **A parallel program achieves a speedup of 9 on 10 processors. What is the maximum fraction (f) of the computation that can be inherently sequential in this program according to Amdahl's Law?** *(2 Marks)*

Second Question: (10 Marks)

a) **A 400 MHz processor was used to execute a benchmark program with the following instruction mix and clock cycle counts:** *(3 marks)*

Instruction type	Instruction Count	Clock Cycle Count
Integer Arithmetic	450,000	1
Data Transfer	320,000	2
Floating Point	150,000	2
Control Transfer	80,000	2

Determine the effective CPI, MIPS rate, and execution time for the program.

b) **For frequency (f) = 0.975 Hz and processors (n) =256, Asymmetric multicore chips can offer maximum speedups that are much greater than symmetric multicore chips (and never worse) is it true? (show how).** *(3 marks)*

c) **State how the workload increase *G(n)* controls the speedup according to Sun and Ni law to be equivalent to Amdahl's law and Gustafson's law.** *(2 marks)*

d) **Draw the architecture block diagram of Single-Node Multi-Core Hyperthreaded GPU Accelerated Computer.** *(2 marks)*

(With my best wishes)