CSL202: Discrete Mathematical Structures (Semester-I-2018-19)	Q	Quiz-06
Name:		
Entry number:		
There are 2 questions for a total of 10 points.		
 Solve the following problems. Show the working in the space provided. (a) (1 point) What is the last digit of 7¹⁰⁰? 		
	(a)	
(b) (1 point) What is the value of $(2^{100} \cdot 3^{60}) \pmod{5}$?		
	(b)	
(c) (1 point) What is the remainder when $\sum_{i=1}^{100} (i)!$ is divided by 9?		
	(c)	

(d) (2 points) Prove or disprove: $(2^n + 6 \cdot 9^n)$ is divisible by 7 for every $n \ge 0$.

2. (5 points) Consider the following problem:

HALTING-INPUT: Given the description $\langle A \rangle$ of algorithm A, determine if there is a halting input for A (that is, there exists an input on which A halts).

An algorithm P is said to solve the above problem if $P(\langle A \rangle)$ halts and outputs 1 when A has a halting input, and it halts and outputs 0 otherwise.

<u>Prove</u>: There does not exist an algorithm P that solves the problem HALTING-INPUT.