KING SAUD UNIVERSITY

COLLEGE OF COMPUTER & INFORMATION SCIENCES
DEPT OF COMPUTER SCIENCE

CSC281 Discrete Mathematics for CS Students
First Semester 1438/1439 AH (Fall 2017)
Second midterm Examination: Tue 05.12.2017 C.E. (Time: 1.5 hours)
Instructor: Dr. Aqil Azmi

Name: **ID:**

1. **[Marks 15]**
A box contains 10 red balls, 10 green balls and 10 yellow balls. A blind folded boy picks 5 balls. Mark the following statements True/False. Mark true only if it is fully guaranteed and give reason,

		True/False	Reason
a	One of the balls is red?		
b	At least 2 balls of same color?		
c	At least 3 balls of same color?		

2. **[Marks 20]**
Use the Chinese Remainder Theorem to solve the two equations: $x \equiv 5 \bmod 7$ and $x \equiv 4 \bmod 10$. Write the general solution. Show all the steps.

3. **[Marks 15]**
Compute $5^{99} \bmod 71$. Show all the details.

4. **[Marks 15]**
Prove using contradiction that there are infinite number of prime numbers.

5. **[Marks 10]**
Use induction to show that $3 \mid (n^3 - n)$ for $n \geq 1$.

6. **[Marks 15]**
Given the sequence $a_n = 3n^2 - 5$. Express this sequence recursively and write the initial condition.

7. **[Marks 10]**
The University phone numbers have the format: 467-XXXX, where X is any of the digits 0-9. How many phones are allotted for the university.