Name ________________________ ID3 _ _ _

based on CH2 of the lecture notes

ECS 315: Probability and Random Processes **2018/1**

HW 1 — Due: August 28, 4 PM

Lecturer: Prapun Suksompong, Ph.D.

Instructions

(a) This assignment has 2 pages.

(b) (1 pt) Work and write your answers **directly on this sheet** (not on another blank sheet of paper). Hard-copies are distributed in class.

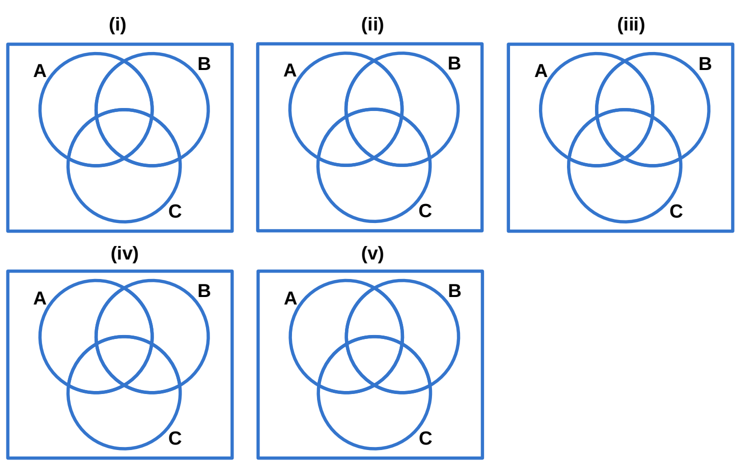
(c) (1 pt) Write your first name and the last three digits of your student ID in the spaces provided on the upper-right corner of this page.

(d) (8 pt) Try to solve all problems.

(e) Late submission will be heavily penalized.

Problem 1. (**Set Theory**) For this problem, only answers are needed; you don't have to describe your solution.

(a) In the Venn diagrams below,



shade the region that corresponds to the following events:

(i) A^c
(ii) $A \cap B$
(iii) $(A \cap B) \cup C$
(iv) $(B \cup C)^c$
(v) $(A \cap B)^c \cup C$

[Montgomery and Runger, 2010, Q2-19]

(b) Let $\Omega = \{0, 1, 2, 3, 4, 5, 6, 7\}$, and put $A = \{1, 2, 3, 4\}$, $B = \{3, 4, 5, 6\}$, and $C = \{5, 6\}$. Find

(i) $A \cup B$
(ii) $A \cap B$
(iii) $A \cap C$
(iv) A^c
(v) $B \setminus A$

Problem 2. For this problem, only answers are needed; you don't have to provide explanation.

For each of the sets provided in the first column of the table below, indicate (by putting a Y(es) or an N(o) in the appropriate cells of the table) whether it is "finite", "infinite", "countable", "countably infinite", "uncountable".

Sets	Finite	Infinite	Countable	Countably Infinite	Uncountable
$\{1\}$					
$\{1, 2\}$					
$[1, 2]$					
$[1, 2] \cup [-1, 0]$					
$\{1, 2, 3, 4\}$					
the power set of $\{1, 2, 3, 4\}$					
the set of all real numbers					
the set of all real-valued x satisfying $\cos x = 0$					
the set of all integers					
$(-\infty, 0]$					
$(-\infty, 0] \cap [0, +\infty)$					