Name ________________________ ID3 _ _ _

EES 315: Probability and Random Processes **2020/1**

HW 1 — Due: September 2, 11:59 PM

Lecturer: Prapun Suksompong, Ph.D.

Instructions

(a) This assignment has 2 pages.

(b) (1 pt) Two choices for submission:

(i) Online submission via Google Classroom

- PDF only. Paper size should be the same as the posted file.
- Only for those who can directly work on the posted PDF file using devices with pen input.
- No scanned work, photos, or screen capture.
- Your file name should start with your 10-digit student ID: "5565242231 315 HW1.pdf"

(ii) Hardcopy submission: Work and write your answers **directly on a hardcopy of the posted file** (not on another blank sheet of paper).

(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.

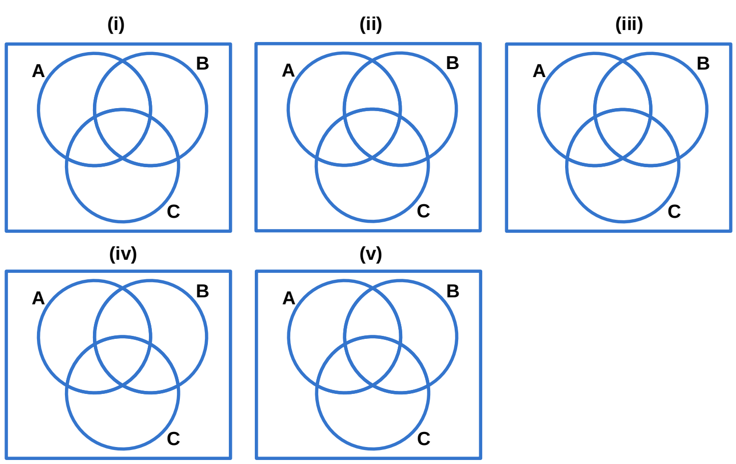
(d) (8 pt) Try to solve all problems.

(e) [ENRpr] = Explanation is not required for this problem.

(f) Late submission will be heavily penalized.

Problem 1. (Set Theory) [ENRpr]

(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. [ENRpr] 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					
$(-\infty, 0]$					
$(-\infty, 0] \cap [0, +\infty)$					