EXERCISE 0

[Chapter 0: On Set Theory]

<u>Question I: (TRUE OR FALSE)</u> Put (T) for true statement and (F) for false statement.

In $\mathbb{R}$:	
1. $(a,b) = \{x \in \mathbb{R}: a < x < b\}$	2. $(a,b) = \{x \in \mathbb{R}: a \le x < b\}$
3. $(a,b) = \{x \in \mathbb{R}: a < x \le b\}$	4. $(a,b) = \{x \in \mathbb{R}: a \le x \le b\}$
5. $[a,b) = \{x \in \mathbb{R}: a < x < b\}$	6. $[a,b) = \{x \in \mathbb{R}: a \le x < b\}$
7. $[a,b) = \{x \in \mathbb{R}: a < x \le b\}$	8. $[a,b) = \{x \in \mathbb{R}: a \le x \le b\}$
9. $(a,b] = \{x \in \mathbb{R}: a < x < b\}$	10. $(a,b] = \{x \in \mathbb{R}: a \le x < b\}$
11. $(a,b] = \{x \in \mathbb{R}: a < x \le b\}$	12. $(a,b] = \{x \in \mathbb{R}: a \le x \le b\}$
13. $[a,b] = \{x \in \mathbb{R}: a < x < b\}$	14. $[a,b] = \{x \in \mathbb{R}: a \le x < b\}$
15. $[a,b] = \{x \in \mathbb{R}: a < x \le b\}$	16. $[a,b] = \{x \in \mathbb{R}: a \le x \le b\}$

In any universal set X:	
17. $(A \cup B)^c = A^c \cup B^c$	18. $(A \cup B)^c = A^c \cap B^c$
19. $(A \cap B)^c = A^c \cup B^c$	20. $(A \cap B)^c = A^c \cap B^c$
21. $(\cup_i A_i)^c = \cup_i A_i^c$	22. $(\cup_i A_i)^c = \cap_i A_i^c$
23. $(\cap_i A_i)^c = \cup_i A_i^c$	24. $(\cap_i A_i)^c = \cap_i A_i^c$
25. $A \cap (B \cup C) = (A \cup B) \cap (A \cup C)$	26. $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
27. $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$	28. $A \cup (B \cap C) = (A \cap B) \cup (A \cap C)$
29. $A \cup (\cap_i A_i) = \cap_i (A \cup A_i)$	30. $A \cup (\cap_i A_i) = \cup_i (A \cap A_i)$
31. $A \cap (\cup_i A_i) = \cap_i (A \cup A_i)$	32. $A \cap (\cup_i A_i) = \cup_i (A \cap A_i)$

Let $\{D_n: n \in \mathbb{N}\}$ $be\ an\ indexed\ family\ of\ sets, wherw\ D_n = \left(0, \frac{1}{n}\right)$. **Then**	
33. $D_3 \cup D_7 = D_3$	34. $D_3 \cup D_7 = D_7$
35. $D_3 \cap D_7 = D_3$	36. $D_3 \cap D_7 = D_7$
37. $D_s \cup D_t = D_r, where,$ $r = min\{s,t\}$.	38. $D_s \cup D_t = D_r, where,$ $r = max\{s,t\}$.
39. $D_s \cap D_t = D_r, where,$ $r = min\{s,t\}$.	40. $D_s \cap D_t = D_r, where,$ $r = max\{s,t\}$.
41. $\cup\{D_n: n \in M \subset \mathbb{N}\} = D_r,$ $where\ r = min\{n: n \in M\}$.	42. $\cup\{D_n: n \in M \subset \mathbb{N}\} = D_r,$ $where\ r = max\{n: n \in M\}$.
43. $\cap\{D_n: n \in M \subset \mathbb{N}\} = D_r,$ $where\ r = min\{n: n \in M\}$.	44. $\cap\{D_n: n \in M \subset \mathbb{N}\} = D_r,$ $where\ r = max\{n: n \in M\}$.
45. $\cup\{D_n: n \in \mathbb{N}\} = (0,1)$.	46. $\cup\{D_n: n \in \mathbb{N}\} = \emptyset$.
47. $\cap\{D_n: n \in \mathbb{N}\} = (0,1)$.	48. $\cap\{D_n: n \in \mathbb{N}\} = \emptyset$.

Let $\{D_n: n \in \mathbb{N}\}$ $be\ an\ indexed\ family\ of\ sets, wherw\ D_n = (-n,n)$. **Then**	
49. $D_3 \cup D_7 = D_3$	50. $D_3 \cup D_7 = D_7$
51. $D_3 \cap D_7 = D_3$	52. $D_3 \cap D_7 = D_7$
53. $D_s \cup D_t = D_r, where,$ $r = min\{s,t\}$.	54. $D_s \cup D_t = D_r, where,$ $r = max\{s,t\}$.
55. $D_s \cap D_t = D_r, where,$ $r = min\{s,t\}$.	56. $D_s \cap D_t = D_r, where,$ $r = max\{s,t\}$.
57. $\cup\{D_n: n \in M \subset \mathbb{N}\} = D_r,$ $where\ r = min\{n: n \in M\}$.	58. $\cup\{D_n: n \in M \subset \mathbb{N}\} = D_r,$ $where\ r = max\{n: n \in M\}$.
59. $\cap\{D_n: n \in M \subset \mathbb{N}\} = D_r,$ $where\ , r = min\{n: n \in M\}$.	60. $\cap\{D_n: n \in M \subset \mathbb{N}\} = D_r,$ $where, r = max\{n: n \in M\}$.
61. $\cup\{D_n: n \in \mathbb{N}\} = \mathbb{R}$.	62. $\cup\{D_n: n \in \mathbb{N}\} = (-1,1)$.
63. $\cap\{D_n: n \in \mathbb{N}\} = \emptyset$.	64. $\cap\{D_n: n \in \mathbb{N}\} = (-1,1)$.

ANSWER OF QUESTION I: (TRUE OR FALSE)

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Answer			F			T			F			F			F	

Question	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Answer		T			F			F			T			F		

Question	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Answer	T			T			F			F			T			T

Question	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
Answer			T			T			F			F			F	