

School of Law, Kanazawa University  
Special Lecture on Jurisprudence, Final Examination  
10 Feb. 2017, Hidehiko Adachi

1. Assume that  $A=1$  and  $B=1$  ( $A$  and  $B$  are both true) while  $X=0$  and  $Y=0$  ( $X$  and  $Y$  are both false). Calculate the truth value of each wff below. (6 points)<sup>\*1</sup>

- (a)  $\sim (A \cdot X)$
- (b)  $(\sim B \supset A)$
- (c)  $\sim ((A \supset B) \supset (B \supset Y))$

2. Prove each of these arguments to be valid or invalid<sup>\*2</sup>.

- (a)  
 $A$   
 $\therefore (A \vee B)$
- (b)  
 $(A \supset B)$   
 $(B \supset C)$   
 $\therefore (A \supset C)$
- (c)  
 $((A \cdot B) \supset C)$   
 $\therefore (B \supset C)$

3. Translate these English sentences into wffs. (4 points)<sup>\*3</sup>

- (a) Something is a cat.
- (b) Everything is a cat.
- (c) All dogs are animals.
- (d) Some logicians are evil.

4. Prove each of these arguments to be valid or invalid.<sup>\*4</sup>

- (a)

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<sup>\*1</sup> Harry J. Gensler, *Introduction to Logic* (2nd edn, 2010), 6.3a: 1, 6, 15.

<sup>\*2</sup> 7.1a: 2, 6, 7.2a: 7.

<sup>\*3</sup> 8.1a: 2, 5, 7, 9.

<sup>\*4</sup> 8.2a: 1, 5, 8.3a: 1.

$$(x)Fx$$

$$\therefore (x)(Gx \vee Fx)$$

(b)

$$(x)(Fx \supset Gx)$$

$$(\exists x)Fx$$

$$\therefore (\exists x)(Fx \cdot Gx)$$

(c)

$$(\exists x)Fx$$

$$\therefore (x)Fx$$

5. Prove each of these arguments to be valid or invalid in S5.\*<sup>5</sup>

(a)

$$A$$

$$\therefore \Diamond A$$

(b)

$$\Diamond A$$

$$\therefore \Box A$$

6. Say in which systems the argument is valid: T, B, S4, or S5.\*<sup>6</sup>

(a)

$$\Diamond \Box A$$

$$\therefore A$$

(b)

$$\Diamond A$$

$$\therefore \Diamond \Diamond A$$

(c)

$$\Diamond \Box A$$

$$\therefore \Box A$$

7. Say whether valid (and give a proof) or invalid (and give a refutation).

$$(A \supset \underline{B})$$

$$\therefore \sim (\underline{A} \cdot \underline{B})$$

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\*<sup>5</sup> 10.2a: 2, 10.3a: 1.

\*<sup>6</sup> 11.1a: 1, 2, 4.

Final Examination (70 points)

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9	9	59.3 point

Overall Score

S(100-90)	A(89-80)	B(79-70)	C(69-60)	D(59-0)	absence
4	2	3	0	0	0