Master of Arts Examination, 2018

(1st Year, 1st Semester)

PHILOSOPHY

[Logic (Western)]

Full Marks : 30 Time : Two Hours

The figures in the margin indicate full marks.

Use a separate answer-script for each group.

Group - A

1. Construct a formal proof of validity for each of the following arguments :

   (a) Any friend of Al is a friend of Bill. Therefore anyone who knows a friend of Al knows a friend of Bill.(Px : x is a person. Fxy : x is a friend of y. Kxy : x knows y. a : A1. b : Bill).

   (b) $(x)\{Kx \supset [(\exists y)Lxy \supset (\exists z)Lzx]\}$
   $(x)[(\exists z)Lzx \supset Lxx]$
   $\sim(\exists x)Lxx$
   $\therefore (x)(Kx \supset (y) \sim Lxy)$

[*Turn over*]

(c) Construct demonstration for the following :

$(y)\left[Fy \supset (\exists x)Fx\right]$ (4×2)+2=10

Or

2. Symbolize the following using the suggested notations.

(a) If something is missing, then if nobody calls the police, it will not be recovered. (Mx : x is missing. Px : x is a person. Cx : x calls the police. Rx : x will be recovered).

(b) Anyone who promises everything to everyone is certain to disappoint somebody. (Px : x is a person. Pxyz : x promises y to z. Dxy : x disappoints y).

(c) No charity receives all of his money from any single person. (Cx : x is a charity. Mx : x is money. Px : x is a person. Bxy : x belongs to y. Dxyz : x donates y to z).

(d) Prove the invalidity of the following argument

$(\exists x)(Ax \cdot Bx)$

Ac

$\therefore Bc$

2+3+3+2=10

[*Turn over*]

3. Prove the following in System T

(a) $M \sim p \vee M \sim q \vee M\left(p \vee q\right)$

(b) $\left(p \prec q\right) \supset \left(M\,p \supset M\,q\right)$ 5

Or

4. State the axioms of System *T*. 5

Group - B

5. (a) If S is a formal system in which for each formula A of S there is a formula A' of S that on the intended interpretation expresses the negation of A, then prove that if S is simply consistent, then it is absolutely consistent. 5

(b) If S is a formal system for which it is a metatheorem that $A, A' \vdash_S B$ (where A and B are arbitrary formulas of S, and A' expresses the negation of A on the intended interpretation of S), then prove that if S is absolutely consistent, then it is simply consistent. 5

Or

[*Turn over*]

6. (a) Define a maximal *p*-consistent set of PS.

(b) Prove that any *p*-consistent set of *PS* is a subset of some maximal *p*-consistent set of *PS*. 2+8=10

7. Prove that $\Gamma \cup \left\{\sim A^2\right\}$ is a *p*-inconsistent set of *PS* iff $\Gamma \models_{PS} A$. 5

Or

8. Prove that if $\Gamma \models_{PS} A$, then $\Gamma \models_{P} A$. 5