PG/IS/PHI-102/19

M.A. 1st Semester Examination, 2019

PHILOSOPHY

(*Western Logic*)

PAPER – PHI-102

Full Marks : 40

Time : 2 hours

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

GROUP–A

1. Answer any *four* of the following : 2×4

(*a*) What is multiply general proposition ?

(*b*) Is there any difference between

$(x)(Dx \supset Cx) \supset Cr$ and $(x)(Dx \supset Cx) \supset Cx$

(*c*) Distinguish between individual variable and individual constant.

(*d*) If something is missing, then if nobody calls the police, someone will be unhappy. (Symbolize the above sentence using $Mx : x$ is missing, $Px : x$ is a person, $Cx : x$ calls the police and $Vx : x$ will be unhappy).

(*e*) If any survivors are women, then if all women are fortunate, they are fortunate. (Symbolize the proposition using $Sx : x$ is a survivor, $Wx : x$ is a woman, $Fx : x$ is fortunate)

(*f*) What is invalidity ?

(*g*) What is Truth Tree ?

(*h*) What is the role of counter example in truth tree ?

GROUP–B

2. Answer any *four* of the following : 4×4

(*a*) Construct a formal proof of validity for the following argument.

$(x)\{Ox \supset [(y)(Py \supset Qy) \supset Rx]\}$

$(x)\{Rx \supset [(y)(Py \supset Sy) \supset Tx]\}$

$/ \therefore (y)[Py \supset (Qy \cdot Sy)] \supset (x)(Ox \supset Tx)$

(*b*) Construct a formal proof of validity for the following argument.

$(\exists x)Gx \vee (y)(Gy \supset Hy)$

$(x)(Ix \supset \sim Gx) / \therefore (x)(Gx \supset Ix) \supset (y)(Gy \supset Hy)$

(*c*) Prove the invalidity of the following argument :

$(x)(Kx \supset Lx)$

$(\exists x)(\exists y)(Lx \cdot My) / \therefore (y)(Ky \supset My)$

(*d*) Demonstrate the following :

$[(x)Fx \cdot (x)Gx] \equiv (x)(Fx \cdot Gx)$

(*e*) Establish the logical truth of equivalence of the following form :

$(\nu)(\phi\nu \supset \rho) \equiv [(\exists\mu)(\phi\mu) \supset \rho]$

(*f*) Answer the following :

In what sense can a propositional function be said to follow validly from other propositional functions ?

(*g*) Test the validity of the following in Truth Tree method :

Min is home or on board.
Hen is home or on board.
They are not both on board.

Min is home or Hen is.

(*h*) Test the invalidity of the following in Truth Tree method

$$\frac{\begin{array}{l} A \vee B \\ C \vee D \end{array}}{C}$$

GROUP–C

3. Answer any *two* of the following : 8×2

(*a*) State the revised rule of Existential Instantiation. 8

(*b*) Identify and explain the mistake(s) of the following arguments :

(*i*) 1. $(\exists x)\,(Fx \cdot Gx)$

2. $(\exists x)(\sim Fx \cdot Gx) / \therefore (\exists x)\,(Fx \cdot \sim Fx)$

3. $Fx \cdot Gy$

4. Fx — 3. simp.

5. Fx — 1,3 – 4 *EI*.

6. $\sim Fx \cdot Gx$

7. $\sim Fx$ —— 6. simp.

8. $\sim Fx$ – 2,6 – 7 *EI*.

9. $Fx \cdot \sim Fx$ —— 5,8 Conj

10. $(\exists x)(Fx \cdot \sim Fx)$ – 9 *EG*. 4

(*ii*) 1. $(x)(\exists y)\,(Fx \equiv Gy) / \therefore (\exists y)(x)\,(Fx \equiv Gy)$

2. $(\exists y)\,(Fx \equiv Gy)$ – 1 · UI

3. $Fx \equiv Gy$

4. $(x)\,(Fx \equiv Gy)$ – 3.UG.

5. $(\exists y)(x)\,(Fx \equiv Gy)$ – 4.EG.

6. $(\exists y)(x)\,(Fx \equiv Gy)$ – 2,3 – 5 EI. 4

(*c*) Construct a formal proof of validity of the following arguments.

(*i*) If there are any geniuses, then all great

composers are geniuses. If any one is temperamental, all geniuses are temperamental. Therefore, if anyone is a temperamental geniuses, then all great composers are temperamental. ($Gx : x$ is a genius, $Cx : x$ is a great composer, $Px : x$ is a person, $Tx : x$ is temperamental.) 4

(*ii*) $(\exists x)Xx \supset (y)(Yy \supset Zy)$

$/ \therefore (\exists x)(Xx \cdot Yx) \supset (\exists y(Xy \cdot Zy)$ 4

(*d*) Symbolize the following propositions :

(*i*) If any bananas are yellow, then if all yellow bananas are ripe, they are ripe. ($Bx : x$ is a banana, $Yx : x$ is yellow, $Rx : x$ is ripe) 2

(*ii*) If any officer is present, then either no majors are present or he is a major. ($Ox : x$ is an officer, $Px : x$ is present, $Mx : x$ is major) 2

(*iii*) If all survivors are fortunate and only women were survivors, then if there are any survivors, then some women are

fortunate. (Sx : x is a survivor, Fx : x is fortunate, Wx : x is a woman.) 2

(*iv*) If any employees are lazy, then if some positions have no future, then they will not be successful. (Ex : x is an employee, Lx : x is lazy, Px : x is a position, Fx : x has future, Sx : x will be successful.) 2