4. Prove that

$x \in \bigcap A \leftrightarrow (\forall B)(B \in A \rightarrow x \in B) \,\&\, (\exists B)(B \in A)$

Why can there be no theorem related to Definition K_{14} of the form $x \in \bigcap A \leftrightarrow (\forall B)(B \in A \rightarrow x \in B)$. 8+2

Group – B

5. What was the problem with the set theory ‘in its first “naive” version, due to Cantor’? Why was Von Neumann not satisfied with the approaches suggested by Zermelo and Frankael? Discuss. 6+4

Or

6. In what respect is the axiomatic set theory better than the theory found in the works of Zermelo? Discuss following Von Neumann. 10

7. State the Introductory axioms formulated by Von Neumann. 5

Or

8. State the differences between a I-object and a II-object with suitable examples. 5

Ex/PHIL/PG/4.5.5/2023

Master of Arts Examination, 2023

(2nd Year, 4th Semester)

PHILOSOPHY

[Logic - IV]

Time : Two Hours　　　Full Marks : 30

Answer *either* in English *or* in Bengali.

Group – A

1. State the eight basic definitions of ordering relations (Definition 10 to Definition 17) following Patrich Suppes. 5

Or

2. Prove the following of the Patrick Suppes’s Axiomatic Set Theory: $2\frac{1}{2} \times 2 = 5$

   a) $\bigcup(A \cup B) = (\bigcup A) \cup (\bigcup B)$

   b) $(\wp A) \cup (\wp B) \subseteq \wp(A \cup B)$

3. a) State the Axiom of Regularity. Use the Axiom of Regularity to prove the following : 6

   $A \notin A$

   $-(A \in B \,\&\, B \in A)$

   b) Prove that $A \subseteq A \times A \rightarrow A = 0$. 4

Or