Indian Institute of Technology, Kharagpur
Department of Humanities & Social Sciences

SYMBOLIC LOGIC

MID-SEM EXAMINATION SPRING 2015

Subj. No: HS30068 **Time: 2 hours** **Full marks: 60**

All roughwork must be kept separated in the righthand side margin

1. 1.1 **Briefly explain:**

(a) what validity of an argument is. If premises is true than conclusion should be true

(b) Why soundness is required in addition to validity Because validity does not take into account truthness of premises

(c) What, if any, is the connection between validity and consistency There is no relation

1.2 Is the following argument valid or invalid? Demonstrate your answer by constructing (a) a truth table, and (b) a truth tree for the argument. If invalid, recover the partial truthvalue assignment which establishes this.

$$(M \equiv N) \vee (\sim M \equiv N)$$

$$/ \therefore (\sim M \equiv \sim N) \vee \sim (M \equiv N)$$

6+14=20

2. **True or false? Justify your answer briefly.**

2.1 Russell's paradox is connected to the development of Symbolic Logic bcause it showed that Aristotle's logic had some inherent flaws. True

2.2. The mathematization of Logic was demonstrated by George Boole in his algebra with entities other than the numbers. True

2.3. Modern symbolic logic owes some of its important features from Frege's effort. True

2.4.Aristotle's logic was considered as important only in ancient Greece. False

2.5. Aristotle considered mathematics as the link language and the backbone of all sciences. False

2x5=10

3.**Construct one example of your own for each of the following types of arguments : (a) Deductive argument (b) Inductive argument, and (c) Abductive argument. Explain which properties of your example makes it an instance of that particular type of argument. Examples used in the textbook or in lecture class will NOT be acceptable.** -15-

4. **True or false? Justify your answer briefly.**

4.1. If any two statements p and q are logically equivalent, the tree for {p≡q} will be open. True

4.2. If none of the statements in a set Γ has a negation sign '~', the truth tree for Γ will not have any closed branches. False

4.3. The completed tree of a contingent statement will necessarily have at least one open branch and at leastone closed branch. False

3x5=15

-END-