GD

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

SYMBOLIC LOGIC (Subj. No: HS30068)
MID-SEM EXAMINATION AUTUMN 2016

Time: 2 hours **Full marks: 60**

All roughwork must be kept separated in the righthand side margin. Marks will be deducted for untidy, messy work.

Section A

A1. Identify which of the following is incorrect. Briefly explain why it is incorrect.

(a) The etymological root of the term *logic* in the Greek term 'logos'. True

(b) Frege's project was Logicism: To show how mathematics can be deduced from axioms of logic. True

(c) Temporal logic is a kind of formal logic. True. Temporal Logic Means Logic of tense(future and past)

(d) In the dark ages in Europe, Aristotle's logic was the only Greek heritage that remained in Europe. True

(e) Logic teaches us how to reason. True

(f) Inductive arguments are not meant to provide absolute certainty True.

(g) In 'p ⊃ q', p is the necessary condition. No P is a sufficient condition
If P is false we can't tell about q

2x7=14

A2. Identify which of these is/are *claim*. Briefly justify your answer.

(a) Can airlines tickets be purchased three months before the date of journey? it's either true of false

(b) Overuse of antibiotics can cause harm to people. Is a claim. it's either true or false

(c)Return the book at once! Not a claim. Obviously you are ordering

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A3. True or false? Briefly justify your answer explaining why

(a) An argument is not merely a set of claims. True, it is a structred set of claims, with one principal and other supporting

(b) The statement 'There is no one theory that explains it all' in the following is a *conclusion*: The pursuit for a unified theory is a questionable one; for, there is no one theory that explains it all.

(c) All valid arguments are sound. False Because Sound=(Premises true).(Valid)

(d) An argument with false premises can be valid. True. Validity has nothing to do with falsity of premises

(e) The difference between a unary and a binary connective is in the number of components it can connect. True, unary acts on one, binary acts on two

3x5=15

Section B

B1. Use the truth-tree method to establish whether the given argument is valid or invalid. In case it is invalid, recover the partial true value assignment to support your claim.

Invalid

The members will not vote for the Bill if their party high command orders them, and their party high command orders them if and only if the Bill allows more privatization and also invites direct foreign investment. But the Bill invites direct foreign investment only if the country's law permits it; and indeed the country's law permits it. So, it follows that the members will not vote for the Bill.

[M: The members will vote for the Bill, O: Their party high command orders them, P: The Bill allows more privatization, I: The Bill invites direct foreign investment, L: The country's law permits it] -8-

B2. Use the truth-table method to determine whether the following proposition is tautologous, contradictory or contingent.

$(L \supset D) \supset \{\sim(D \supset N) \supset \sim(N \supset L)\}$ Contingency -5-

B3. Construct a formal derivation for the following argument. No CP or IP is to be used on this problem:

1. $(A \supset B) \bullet (C \supset D)$
2. $A \vee C$
3. $(A \supset \sim D) \bullet (C \supset \sim B)$
4. $(B \bullet \sim D) \supset E$
5. $D \supset (B \vee F) / \therefore O \vee P$ -12-

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