

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
Second Semester - 2022-2023
SYMBOLIC LOGIC HSS F236
Mid Semester Test (Closed Book)

Date: 16-03-2023

Max Marks 60
Duration 90 Minutes

Instructions: Do not use any symbols other than the specified truth-functional connectives; do not use binary language. No marks, if the syllogism is not standard-form. Attempt all parts of a question at one place.

1. Explain the formulations of conditional statements as necessary and sufficient conditions with examples and symbolizations. (10)
2. What is an existential fallacy? Explain with an example. (10)
3. Explain with examples 'sub-contrary' and 'corresponding' propositions in the square of opposition. (10)
4. Use truth tables to decide whether the following biconditionals are tautologies. (10)
 - (i) $[(p \supset (q \supset r)) \equiv (q \supset (p \supset r))]$
 - (ii) $(A \supset B) \equiv [(A \vee \sim B) \equiv B]$
5. Rewrite them into standard-form categorical syllogisms, state their mood and figure, and test their validity or invalidity by Venn diagram. State the fallacy(ies), if the syllogism is invalid. (10)
 - (i) Some warrantless searches are not searches based on probable cause as some warrantless searches are violations of amendment rights but no searches based on probable cause are violations of amendment rights.
 - (ii) Since an artist is not a manager and some managers are not leaders, some leaders are not artists.
6. Symbolize the following argument by suggested notation and use truth-table method to determine its validity or invalidity. (6)

If Smith invests in real estate, he will own a multi-storied building. Either Smith owns a multi-storied building or he has not invested in real estate. Therefore, it is not the case that his not owning a multi-storied building implies that he has not invested in real estate. (R, M)
7. If the syllogism has "I" conclusion, how many valid forms are possible? Construct the logical skeletons using S, P, M terms. (4)