

**63/1 (SEM-4) PHL HC 4106 (CC 10)**

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**PHILOSOPHY**

Paper : CC-10

**( Truth Functional Logic : Propositional  
and Predicate )**

*Full Marks : 80*

*Time : 3 hours*

*The figures in the margin indicate full marks  
for the questions*

1. Choose the correct answer : 1×6=6

(a) Development form of traditional logic is known as

- (i) classical logic
- (ii) deductive logic
- (iii) modern logic
- (iv) inductive logic

(b) There are \_\_\_\_\_ types of logical constant.

- (i) 2
- (ii) 3
- (iii) 4
- (iv) 5

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- (c) In rules of replacement, there are \_\_\_\_\_ rules.
- (i) 9
  - (ii) 10
  - (iii) 11
  - (iv) 12
- (d) '(x)' is known as
- (i) universal quantifier
  - (ii) existential quantifier
  - (iii) bound variable
  - (iv) propositional function
- (e) "All crows are black." The proposition is
- (i) universal affirmative
  - (ii) universal negative
  - (iii) particular affirmative
  - (iv) particular negative
- (f) ' $p \supset q \equiv \sim q \supset \sim p$ ' is known as
- (i) material implication
  - (ii) exportation
  - (iii) transposition
  - (iv) equivalence

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2. Answer the following in brief : 2×5=10
- (a) What is truth table?
  - (b) What are free and bound variables?
  - (c) What are the three logical connectives?
  - (d) Symbolize the proposition by using quantifier :  
"All grass snakes are harmless."
  - (e) What is truth tree?
3. Answer any six of the following questions : 5×6=30
- (a) Explain the nature of logic.
  - (b) What do you mean by interdefinability of logical connectives?
  - (c) What are tautology and contradictory expressions? Give example with truth table.
  - (d) Construct a formal proof of validity for the following argument form :  
$$P \supset Q$$
$$\sim Q \vee R / \therefore \sim R \supset \sim P$$
  - (e) What do you mean by conditional proof? Explain.
  - (f) Explain the rules of indirect proof of validity with example.

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- (g) Write a short note on existential quantifier.  
(h) Mention the rules of quantification.  
(i) Prove invalidity of the following argument :

$$\begin{aligned} A \supset B \\ B \supset C \\ \therefore C \supset A \end{aligned}$$

4. Answer any two of the following questions :

10×2=20

- (a) Discuss shorter truth table method to prove the validity of argument. 10  
(b) What is conjunctive normal form? Discuss with example. 2+8=10  
(c) What is formal proof of validity? Discuss the method to construct a formal proof of validity. 2+8=10

5. Answer elaborately any one of the following : 14

- (a) What is truth function? Explain with the help of truth table. 2+12=14  
(b) What is quantification? Discuss universal and existential quantification with example. 2+12=14

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