63/1 (Sem–4) CC10/PHLHC4106

2024

PHILOSOPHY

Paper : PHLHC4106

(Truth Functional Logic : Propositional and Predicate)

Full Marks : 80

Pass Marks : 32

Time : Three hours

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

1. Choose the correct answer from the following : ***(any six)*** 1×6=6

   (a) Logic is the study of _____

   (i) beauty

   (ii) wealth

   (iii) thought

   (iv) None of the above

(b) The name of the Symbol "$\vee$" is

(i) curl

(ii) dot

(iii) vel

(iv) None of the above

(c) In implicative truth function $(p \supset q)$ is false under the condition of

(i) If both the variable are true

(ii) If both the variable are false

(iii) If the antecedent variable is true and the consequent variable is false

(iv) None of the above

(d) The book authored by P. F. Strawson is

(i) *Introduction to Symbolic Logic*

(ii) *Introduction to Logic*

(iii) *Introduction to Logical Theory*

(iv) None of the above

(e) How many rules of inference are there ?

(i) 10

(ii) 2

(iii) 9

(iv) 4

(f) $p \vee q$
$\sim p$
$\therefore q$

The name of above rule is called

(i) Disjunctive Syllogism

(ii) Conjunctive

(iii) Symplification

(iv) None of the above

(g) The Latin name of Modus Tollens is

(i) Modus Ponens

(ii) Modus Tollendo

(iii) Hypothetical Syllogism

(iv) None of the above

(h) The symbol "~" is

(i) Propositional variable

(ii) Logical constant

(iii) Both propositional variable and logical constant

(iv) None of the above

(i) The word "quantification" was introduced by

(i) Aristotle

(ii) Charles Pierce

(iii) John Venn

(iv) None of the above

(j) The phrase "Given any x" is known as

(i) Existential quantifier

(ii) Universal quantifier

(iii) Propositional function

(iv) None of the above

2. Write short notes on : ***(any five)*** 2×5=10

(a) Logical variable

(b) Predicate logic

(c) Truth table

(d) Tautology statement

(e) Contradictory statement

(f) Quantifier

(g) Propositional function

3. Answer the following questions : ***(any six)*** 5×6=30

(a) Name *any five* rules of inference.

(b) Symbolize the following singular propositions : 1×5=5

(i) Ram is wise.

(ii) Socrates is mortal.

(iii) Descartes is human.

(iv) Boston is not human.

(v) Aristotle is intelligent.

(c) What is truth functions ? Explain conjunctive and disjunctive truth functions with truth table.

(d) Prove the validity or invalidity of the given statements using shorter truth-table method. 2+3=5

(i) $\sim p \vee \sim q$

p

$\therefore \sim q$

(ii) $p \vee q$

$q \vee r$

$\therefore p \cdot r$

(e) Why is truth table method called a decision procedure ?

(f) Prove the invalidity of each of the following arguments by the method of assigning truth values : 2+3=5

(i) $A \supset B$

$C \supset D$

$B \vee C$

$\therefore A \vee D$

(ii) $E \supset (F \vee G)$
$G \supset (H \cdot I)$
$\sim H$
$\therefore E \supset I$

(g) What is formal proof of validity ?

(h) What is the difference between propositional logic and predicative logic ?

(i) Explain interdefinability of logical constants with the help of truth table.

(j) Distinguish between logical constant and propositional variable.

4. Answer the following questions : ***(any two)*** 10×2=20

(a) Symbolize the following statements by using quantifier : 2×5=10

(i) Some men are honest.

(ii) All mangoes are sweet.

(iii) Everything is movable.

(iv) Some men are not intelligent.

(v) No philosophers are scientists.

(b) Construct truth table of the following compound expressions and determine whether they are tautologies, contradictory and contingent : 5+5=10

(i) $\sim (p \supset q)$

(ii) $\sim p \supset \sim (p \cdot q)$

(c) Construct truth table and determine the validity or invalidity of the following arguments :

(i) $p \supset q$
$\sim p$
$\therefore \sim q$

(ii) $p \vee q$
$\sim p$
$\therefore q$

(d) Construct the formal proof of validity : 5+5=10

(i) $A \supset B$
$C \supset D$
$(\sim B \vee \sim D) \cdot (\sim A \vee \sim B)$
$\therefore \sim A \vee \sim C$

(ii) $A \supset B$

$A \vee (B \vee \sim C)$

$\sim B$

$\therefore \sim C \cdot \sim B$

5. Answer elaborately ***any one*** of the following : 14

(a) What are the basic differences between the rules of inference and the rules of replacement ? Discuss.

(b) What is quantification ? Discuss AEIO propositions by means of quantifiers.

(c) How can we test the validity of argument by the truth table ?