Total number of printed pages–10

63/1 (SEM–4) CC10/PHLHC4106

2025

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) Under what condition a conjunctive function becomes true ?

   (i) when both the conjuncts are true

   (ii) when both the conjuncts are false

   (iii) when first conjunct is true, second conjunct is false

(iv) when first conjunct is false, second conjunct is true

(b) The name of the symbol '~' is—

(i) curl (ii) dot

(iii) vel (iv) horseshoe

(c) How many kinds of truth-values are there in symbolic logic ?

(i) one (ii) two

(iii) three (iv) four

(d) "$(p.q) \supset r$" can be equivalently re-written as—

(i) $p \cdot (q \supset r)$

(ii) $p \supset (q \supset r)$

(iii) $(p \supset q) \supset r$

(iv) $(p \cdot q) \cdot r$

(e) $p \supset q$

p

$\therefore q$

The name of the above rule is—

(i) Modus tollens

(ii) Conjunctive syllogism

(iii) Disjunctive syllogism

(iv) Modus ponens

(f) What is the meaning of Latin phrase "Reductio ad Absurdum" ?

(i) Decision procedure

(ii) Tautology

(iii) Reduction to Absurdity

(iv) Contingency

(g) Universal quantifier stands for—

(i) There exist at least one X

(ii) Something is X

(iii) Given any X

(iv) None of the above

(h) What will be the symbolic form of the proposition —"All mammals are cats"—

(i) $(X)(MX \supset CX)$

(ii) $(\exists X)(MX \supset CX)$

(iii) (X) (MX·CX)

(iv) $(\exists X)$ (MX·CX)

(i) Conjunctive function deals with—

(i) Separating statements

(ii) Negating statements

(iii) Connecting statements

(iv) All of the above

(j) What is the truth value of the following statement—
"Why are you late" ?

(i) True

(ii) False

(iii) Neither true nor false

(iv) None of the above

2. Answer the following questions : ***(any five)*** 2×5=10

(a) What is predicate logic ?

(b) What do you mean by existential quantifier ?

(c) State the rule of constructive dilemma.

(d) Write a short note on Truth-function.

(e) What is propositional variable ?

(f) What do you mean by Truth Tree Method ?

(g) Write a brief note on individual constant.

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

(a) What is conditional proof ? Explain with examples.

(b) Illustrate various logical constants with suitable examples.

(c) What are the differences between rules of inference and rules of replacement ? Explain.

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

(i) $G \supset H$

$\sim G \supset H$

$\therefore H$

(ii) $P \supset (q \cdot r)$

$P \vee (q \cdot r)$

$\therefore q \cdot r$

(e) Prove the invalidity of the following arguments by the method of assigning truth–values. 2+3=5

(i) $\sim (E \cdot F)$

$(\sim E \cdot \sim F) \supset (G \cdot H)$

$H \supset G$

$\therefore G$

(ii) $M \supset (N \vee O)$

$N \supset (P \vee Q)$

$Q \supset R$

$\sim (R \vee P)$

$\therefore \sim M$

(f) Symbolize the following singular propositions :

(i) Lions exist.

(ii) Everything is movable.

(iii) Nothing is permanent.

(iv) There are elephants.

(v) Plato is philosopher.

(g) Use conditional proof to prove the validity of the following arguments—

(a) $A \supset (B \cdot C)$

$(B \vee C) \supset L$

$\therefore A \supset L$

(b) $P \vee [(K \supset P) \cdot (Q \supset P)]$

$M \cdot (K \vee Q)$

$\therefore P$

(h) What are the strategies for constructing indirect proof ?

(i) Write a note on Truth-Table method.

(j) What do you mean by form of conjunction and form of disjunction? Explain briefly.

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

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

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

(ii) $\sim[p \supset (p \vee q)]$

(b) Construct truth table and determine the validity of the following arguments : 5+5=10

(i) $p \supset q$

$q \supset r$

$\therefore p \supset r$

(ii) $p \supset q$

$\sim q$

$\therefore \sim p$

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

(i) $A \cdot B$

$(A \vee C) \supset D$

$/ \therefore A \cdot D$

(ii) $(A \vee B) \supset C$

$(C \vee B) \supset [A \supset (D \equiv E)]$

$A \cdot D$

$\therefore D \equiv E$

(d) How to symbolize *A*, *E*, *I* and *O* propositions ? Discuss with examples.

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

(a) Explain various kinds of truth function with truth table.

(b) What is formal proof of validity ? State *five* rules of inference and *five* rules of replacement.

(c) What is quantification ? Explain the rules of quantification.
