

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, MAY 2025

SECOND YEAR [BATCH 2023-27]

PHILOSOPHY

Paper : 4PHIMJC1

Date : 03/05/2025

Time : 11 am – 1 pm

Full Marks : 50

(Use a separate Answer Book for each Group)

Group-A

1. Answer **any two** of the following questions: [2×5]

- Briefly explain the difference between logical equivalence and material equivalence with examples.
- Explain, with examples, the general rules of implication.
- Distinguish between a tautologous statement form and a contingent statement form with examples.
- What are the paradoxes of material implication? Briefly explain with examples.

Answer **either** question No. 2 **or** Question No. 3 (**any one**): [1×15]

2. a) Use truth tables to characterise the following statement forms as tautologous, self-contradictory or contingent : (2+2)

i) $(p \vee p) \equiv p$

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

b) Use truth tables to determine the validity or invalidity of the following arguments (**any three**): (3×3)

i) $(A \vee B) \supset (A \cdot B)$

$$A \cdot B / \therefore A \vee B$$

ii) If people are entirely rational, then either all of a person's actions can be predicted in advance or the universe is essentially deterministic. Not all of a person's actions can be predicted in advance. Thus, if the universe is not essentially deterministic, then people are not entirely rational.

iii) If terrorists demands are met then lawlessness will be rewarded. If terrorists demands are not met then innocent hostages will be murdered. So either lawlessness will be rewarded or innocent hostages will be murdered.

iv) $(P \supset Q) \cdot [(P \supset Q) \supset R]$

$$P \supset (R \supset S) / \therefore P \supset S$$

c) What is the exclusive sense of 'or'? (2)

3. a) Determine by the method of resolution whether the following forms of proposition are equivalent : (3×2)

i) $[p \cdot (q \vee r)], [(p \cdot q) \vee (p \cdot r)]$

ii) $(p \equiv q), [(p \supset q) \cdot (q \supset p)]$

- b) Test the validity of the following arguments by the method of resolution (**any one**) : (1×3)
- i) $(p \supset q) \cdot (r \supset s)$
 $p \vee r / \therefore q \vee s$
- ii) $P \supset (Q \supset R) / \therefore (P \cdot Q) \supset R$
- c) Determine by fell swoop method whether each of the following schema implies the other : (3×2)
- i) $(p \cdot r)$
- ii) $p \supset (q \supset r)$

Group-B

4. Answer **any two** of the following questions: [2×5]
- a) Explain, with examples, the rule of existential instantiation (E.I).
- b) If, in a formal proof, the premises are found inconsistent, then the argument can not be invalid. — Explain with an example.
- c) Distinguish between free variable and bound variable with examples.
- d) How does truth function differ from propositional function? Explain with illustration.

Answer **either** question No. 5 **or** Question No. 6 (**any one**) : [1×15]

5. a) Symbolise the following using quantifiers, variable etc wherever necessary : (**any four**) (4×1)
- i) No car is safe unless it has good brakes.
- ii) Apples and oranges are delicious and nutritious.
- iii) There are traitors.
- iv) Carol is a book worm.
- v) Not every writer is talented who is famous.
- vi) A gladiator who wins if and only if he is lucky is not skillful.
- b) Prove the invalidity of the following arguments by assigning truth values (**any three**) : (3×3)
- i) If anything is metallic, then it is breakable. There are breakable ornaments. Therefore, there are metallic ornaments.
- ii) Some physicians are quacks. Some quacks are not responsible. Therefore some physicians are not responsible.
- iii) $(\exists x) (Yx \cdot Zx)$
 $(\exists x) (Ax \cdot Zx)$
 $\therefore (\exists x) (Ax \cdot \sim Yx)$

$$\begin{aligned} \text{iv) } & (x)(Hx \supset \sim Lx) \\ & (\exists x)(Jx \cdot \sim Lx) \\ & \therefore (x)(Hx \supset Jx) \end{aligned}$$

$$\begin{aligned} \text{v) } & A \equiv (B \vee C) \\ & B \equiv (C \vee A) \\ & C \equiv (A \vee B) \\ & \sim A \\ & \therefore B \vee C \end{aligned}$$

c) For each of the following give a normal form formula logically equivalent to the given one : (1+1)

$$\text{i) } \sim (x)(\sim Kx \vee \sim Lx)$$

$$\text{ii) } \sim (\exists x)(Gx \cdot \sim Hx)$$

6. Construct formal proof of validity for the following arguments (**any three**) (3×5)

$$\begin{aligned} \text{a) } & A \\ & \therefore B \vee \sim B \end{aligned}$$

$$\begin{aligned} \text{b) } & z \supset A \\ & z \vee A \\ & \therefore A \end{aligned}$$

c) Socrates was a great philosopher. Therefore, either Socrates was happily married or else he was not.

d) Oranges are sweet.
Lemons are tart.
Therefore oranges and lemons are sweet or tart.

$$\begin{aligned} \text{e) } & (L \supset H) \cdot (Q \supset S) \\ & \therefore (L \cdot Q) \supset (H \cdot S) \end{aligned}$$

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