DAY — 06 SEAT NUMBER | | | | | | |

2025	II	17	1100	J-284	(E)

LOGIC (47)

Time : 3 Hrs. **(7 Pages)** **Max. Marks : 80**

Note : *(1) All questions are compulsory.*

(2) Figures to the right indicate full marks.

(3) Whole statement should be written with answer for objective questions.

(4) Answer to each question should be written on a new page.

Q. 1. (A) Fill in the blanks using suitable words/terms from those given in the brackets : (6) **[10]**

(1) _____ is a factor whose effect the experimenter wishes to determine.

[Independent variable/ Dependent variable]

(2) _____ is an individual variable.

[ψ / x]

(3) The_____ term of the conclusion is called the major term in syllogism.

[subject / predicate]

(4) A guess or supposition as to how facts are connected is called as _____.

[Hypothesis / Law]

(5) In_____ proposition both the terms are distributed.

[E / I]

(6) $(p \vee q) \equiv (q \vee p)$ is the rule of _____.

[Commutative law/ Associative law]

(B) Give logical terms for the following statements : (4)

(1) The opposition between universal proposition and its corresponding particular proposition.

(2) Perception with a definite purpose.

(3) A branch of logic in which proposition is taken as one unit.

(4) A tentative solution to the problem.

Q. 2. **(A)** State whether the following statements are True or False: (6) **[10]**

(1) The use of scientific instruments improve the quality of observation.

(2) When any rule of syllogism is violated, the argument commits non-formal fallacy.

(3) Propositional function is neither true nor false.

(4) Equivalence is false when both of its components are true.

(5) Hypothesis is said to be the result of rational activity.

(6) Obversion is a kind of Eduction.

(B) Match the words in Group 'A' with those in Group 'B' : (4)

	Group 'A'		Group 'B'
(a)	Monadic connective	(1)	Self-consistent
(b)	Uniformity of nature	(2)	~ (Curl)
(c)	Hypothesis	(3)	Principle of reductio-ad-absurdum
(d)	Indirect Proof	(4)	Formal ground of induction
		(5)	Material ground of induction

Q. 3. **(A)** Use shorter-truth table method to state whether the following statement forms are tautologous or not (Any TWO) : **[12]** (6)

(1) $(p \supset \sim q) \supset (p \vee q)$

(2) $(p \cdot q) \vee \sim (p \cdot q)$

(3) $(p \vee p) \equiv \sim p$

(B) Construct formal proof of validity by using conditional proof (C.P.) or indirect proof (I.P.) for the following arguments (Any TWO) : (6)

(1) (i) $R \supset T$

(ii) $P \supset Q$

(iii) $Q \supset (T \supset J)$

(iv) $\sim J$ $/\therefore P \supset \sim R$

(2) (i) $(J \vee N) \supset S$

(ii) $(L \vee H) \supset (I \cdot J)$ $/\therefore L \supset S$

(3) (i) $C \vee R$

(ii) $(C \vee O) \supset (T \cdot B)$

(iii) $\sim B$ $/\therefore R$

Q. 4. **(A)** Give opposition of the following propositions given in the brackets as directed (Any THREE) : (6) **[12]**

(1) Some glasses are transparent.

[Sub – contrary and Contradictory]

(2) Every peacock is beautiful.

[Contrary and Sub – altern]

(3) Some mobile phones are not expensive.

[Sub – contrary and Sub – altern]

(4) No pearl is a diamond.

[Contradictory and Contrary]

(5) Some poems are rhythmic.

[Sub – altern and Contradictory]

(B) Give Converse and Obverse of the following propositions (Any THREE) : (6)

(1) No submarine is aeroplane.

(2) Some toys are colourful.

(3) Some chemicals are not harmful.

(4) Every word is meaningful.

(5) No river is ocean.

Q. 5. **(A)** Give reasons for the following (Any TWO) : (4) **[12]**

(1) Singular proposition is called as universal proposition in traditional logic.

(2) Rules of inference and rules of replacement along with Conditional proof (C.P.) and Indirect proof (I.P.) are not sufficient to prove validity of all arguments.

(3) A term cannot be distributed in the conclusion unless it is distributed in the premise.

(B) Recognize with reasons the formal fallacies committed in the following categorical syllogisms (Any TWO) : (4)

(1) No hibiscus are roses.
Some flowers are not roses.
Therefore some flowers are not hibiscus.

(2) All apricots are fruits.
All chikoos are fruits.
Therefore all chikoos are apricots.

(3) No ships are rafts.
Some boats are ships.
Therefore some boats are rafts.

(4) All birds are mortal.
All birds are animals.
All fishes are marine animals.
Therefore all marine animals are mortal.

(C) Symbolize the following propositions using appropriate quantifiers and propositional functions given in the brackets (Any FOUR) : (4)

(1) All books are informative.
[Bx — x is a book]
[Ix — x is informative]

(2) No apple is mango.

[Ax — x is an apple]

[Mx — x is mango]

(3) Some classrooms are spacious.

[Cx — x is Classroom]

[Sx — x is spacious]

(4) Some minerals are not rare.

[Mx — x is mineral]

[Rx — x is rare]

(5) Mumbai is a city.

[Cx — x is a city]

[m — Mumbai]

(6) There are no giants.

[Gx — x is giant]

Q. 6. **(A)** Explain the following terms (Any TWO) : (6) **[12]**

(1) The rule of Universal Generalization (U.G.)

(2) No conclusion can be drawn from two negative premises.

(3) Sub-contrary relation.

(B) Construct formal proof of validity for the following arguments (Any TWO) : (6)

(1) (i) $(x)(Dx \supset Mx)$

(ii) $(x)(Mx \supset Tx)$ $\quad /\therefore (x)(Dx \supset Tx)$

(2) (i) $(\exists x)(Bx \cdot \sim Jx)$

(ii) $(x)(Fx \supset Jx)$ $\quad /\therefore (\exists x)(Bx \cdot \sim Fx)$

(3) (i) $(x)(Gx \supset Dx)$

(ii) Gb $\quad /\therefore Db \vee Rb$

Q. 7. **(A)** Answer the following questions in brief (Any TWO) : (6) **[12]**

(1) Explain with an example 'limitations of sense organs and instruments', as a condition of good observation.

(2) 'Hypothesis is always provisional in nature.' Explain.

(3) Explain the fallacies of Non-observation with an example.

(4) 'Hypothesis must be compatible with pro-established knowledge.' Explain.

(B) Answer the following (Any ONE) : (6)

(1) What is experiment? Explain the nature of experiment.

(2) Explain with an illustration any three factors that can suggest a hypothesis.

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