



K23U 1927

Reg. No. :

Name :

**II Semester B.A. Degree (CBCSS – OBE – Regular/Supplementary/
Improvement) Examination, April 2023
(2019 Admission Onwards)**

**COMPLEMENTARY ELECTIVE COURSE IN PHILOSOPHY
2C03 PHI : Symbolic Logic and Computer Application**

Time : 3 Hours

Max. Marks : 40

**PART – A
(Short Answer)**

Answer **all** questions. **Each** answer carries **1** mark.

1. Explain the phrase 'truth functional compound statement'.
2. Define a logical gate.
3. Name the English mathematician who introduced algebraic notations to symbolize and validate deductive arguments.
4. Define an argument form.
5. Define the specific form of a given argument.
6. Name the text on symbolic logic that was coauthored by Bertrand Russell and Alfred North Whitehead. (6×1=6)

**PART – B
(Short Essay)**

Answer **any six** questions. **Each** answer carries **2** marks.

7. What is a modifier ? Give the truth table of the modifier used in symbolic logic.
8. Give the truth table for OR operator and OR gate.

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9. Use truth table to determine the validity or invalidity of the argument form
 $p \supset q$
 $\therefore \sim p \supset \sim q$
10. Convert the following decimal numbers to binary numbers :
17, 28.
11. Give the truth table for material implication.
12. Symbolizing 'Amherst wins its first game' as 'A', 'Colgate wins the first game' as 'C' and 'Dartmouth wins its first game' as 'D', symbolize the following compound statement :
If Amherst does not win its first game, then it is not the case that either Colgate or Dartmouth wins its first game.
13. Draw the NAND gate.
14. When are two statements said to be logically equivalent to each other ? (6×2=12)

**PART – C
(Essay)**

Answer **any four** questions. **Each** answer carries **3** marks.

15. Use truth table to decide if the following biconditional is a tautology :
 $(p \supset q) \equiv (\sim q \supset \sim p)$
16. Convert the following binary numbers to decimal numbers :
 $(1101)_2, (11001)_2$
17. Explain the De Morgan's Theorem and draw the truth table for the same.
18. Give the truth table for the AND and NOT Boolean operators.
19. Give a brief history of the evolution of symbolic logic.
20. Determine whether the given argument form is valid or invalid using the truth table technique :
 $p \supset (q \vee r)$
 $q \supset (p \vee r)$
 $\therefore (p \vee q) \supset r$

(4×3=12)



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**PART – D
(Long Essay)**

Answer **any two** questions. **Each** answer carries **5** marks.

21. What are the three basic logical operators in Boolean algebra ? Show its truth tables and logical gates.
22. Give the rules of the basic truth functional connectives and modifier and draw their truth tables.
23. Distinguish between tautologous, contradictory and contingent statement forms with suitable examples.
24. Use truth table to determine the validity or invalidity of the following argument :
If Montana suffers a severe drought, then, if Nevada has its normal light rainfall, Oregon's water supply will be greatly reduced. Nevada does have its normal light rainfall. So, if Oregon's water supply is greatly reduced, then Montana suffers a severe drought. (2×5=10)