

**Second Semester FYUGP Degree (Reg) Examination April
2026**

KU2DSCPHY125 - DIGITAL ELECTRONICS

2024 Admission onwards

Time : 1.5 hours

Maximum Marks : 50

Section A

Answer any 6 questions. Each carry 2 marks.

1. Implement $X = (A+B)(C+D)$ using NOR Gates.
2. Express $A + B$ using three NAND gates.
3. Convert the binary number 11101 to decimal.
4. What is the binary equivalent of the hexadecimal number $F7A9_{16}$.
5. What is associative law of Boolean algebra?
6. Convert the Boolean Expression to POS form.

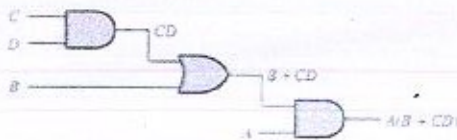
$$AB + B(CD + EF)$$

7. How is the decimal number 25 represented in BCD?
8. Mention any two applications of AND gate.

Section B

Answer any 4 questions. Each carry 6 marks.

9. Prove $(A+B)(A+C) = A+BC$?
10. Construct the truth table for the given logic circuit?

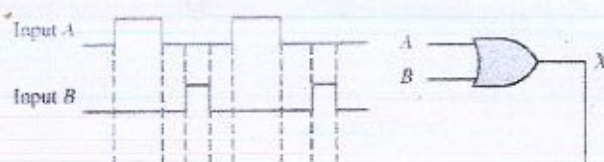


11. Determine the truth table for the following standard POS expressions:
 a) $(A + B + C)(A + \bar{B} + C)(A + \bar{B} + \bar{C})(\bar{A} + B + \bar{C})(\bar{A} + \bar{B} + C)$
 b) $(A + \bar{B} + C)(A + B + \bar{C})(\bar{A} + \bar{B} + \bar{C})$
12. Describe the basic process of converting an analog signal into a digital signal.

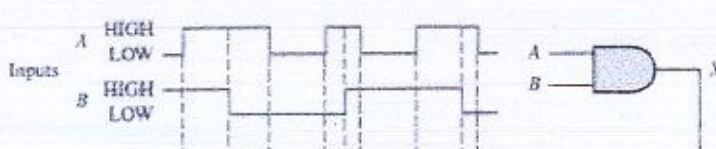
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13. Write a brief note on the working of NAND gate. Sketch the gate operation with waveform inputs.
14. If the two input waveforms, A and B, in figure are applied to the following gates, what is the resulting output waveform?

a)



b)



Section C

Answer any 1 questions. Each carry 14 marks.

15. (a) Consider the logic expressions
 1) $X = (A+B).(C+D)$ 2) $X = AB + CD$
 Construct the logic diagrams of 1 & 2 with
 a) NAND gates only
 b) NOR gates only
 (b) Explain the working of 4bit comparator with logic symbol
16. (a) Convert $(235)_{10}$ and $(146)_{10}$ into 8-bit binary numbers and perform their binary addition. Check for overflow and justify your answer.
 (b) Perform binary subtraction using 2's complement method: $(1101011)_2 - (1000110)_2$ and verify by converting the result to decimal.