Skills Compétences Canada
Yukon

2026 Yukon Skills #16 Electronics

April 16, 2026

Circuit Analysis (90 mins)
25% of overall mark

Name: _____

Competitor #: _____

2026 Yukon Skills Competition

Circuit Analysis

The time allowed for completion is **90 minutes**.

This event is worth **25%** of the total competition mark.

Instructions

Below you will find a logic circuit on a PCB displayed in different views. Neatly and accurately convert the PCB and create the equivalent logic diagram. You do **not** need to show power connections, only the inputs (INPUT A, B, C & D), the output (OUTPUT) and the individual logic gates. Use the correct circuit symbols for the logic gates.

Once you have completed the circuit diagram, answer the questions in the spaces provided.

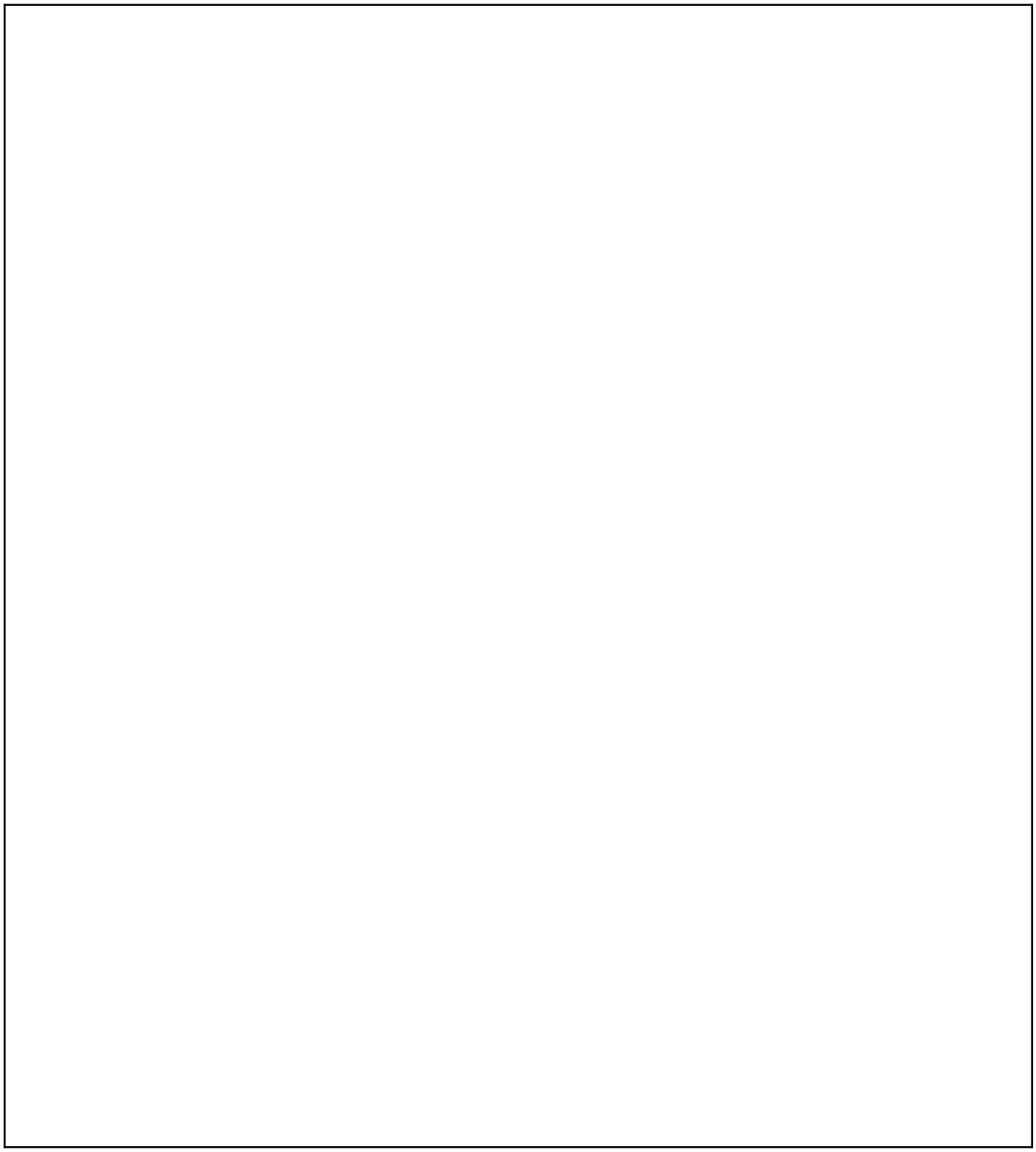
When you have completed the assignment please ensure that your name and competitor number is on your paper. Complete the questions in the space provided and then place this paper on the judge's table and leave the competition area.

Marking Criteria

Layout	20%
Neatness	20%
Accuracy	40%
Questions	20% (adjusted from 16 marks)

Logic Diagram

Draw the logic diagram of the PCB in the box below:



Circuit Analysis Questions:

1) Complete the truth tables for the following gates:

AND GATE		
A	B	OUT
0	0	
0	1	
1	0	
1	1	

OR GATE		
A	B	OUT
0	0	
0	1	
1	0	
1	1	

NOT GATE	
IN	OUT
0	
1	

[5 marks]

2) In the logic circuit, if INPUT A = 1, INPUT B = 1, INPUT C = 1 and INPUT D = 1, what is the state of OUTPUT?

[2 marks]

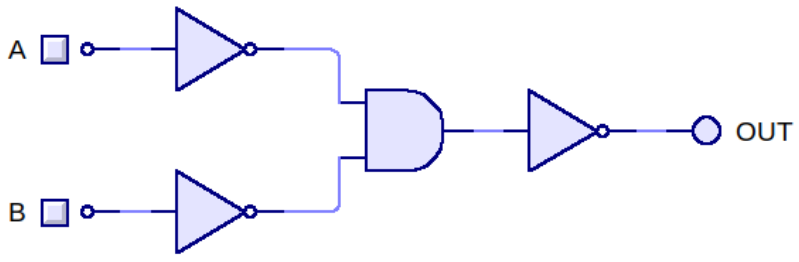
3) In the logic circuit, if INPUT A = 1, INPUT B = 0, INPUT C = 0 and INPUT D = 1, what is the state of OUTPUT?

[2 marks]

4) What is the percentage gate utilization for this circuit (gates used / total gates, as a %)?

[2 marks]

5) Complete the truth table for this logic combination:



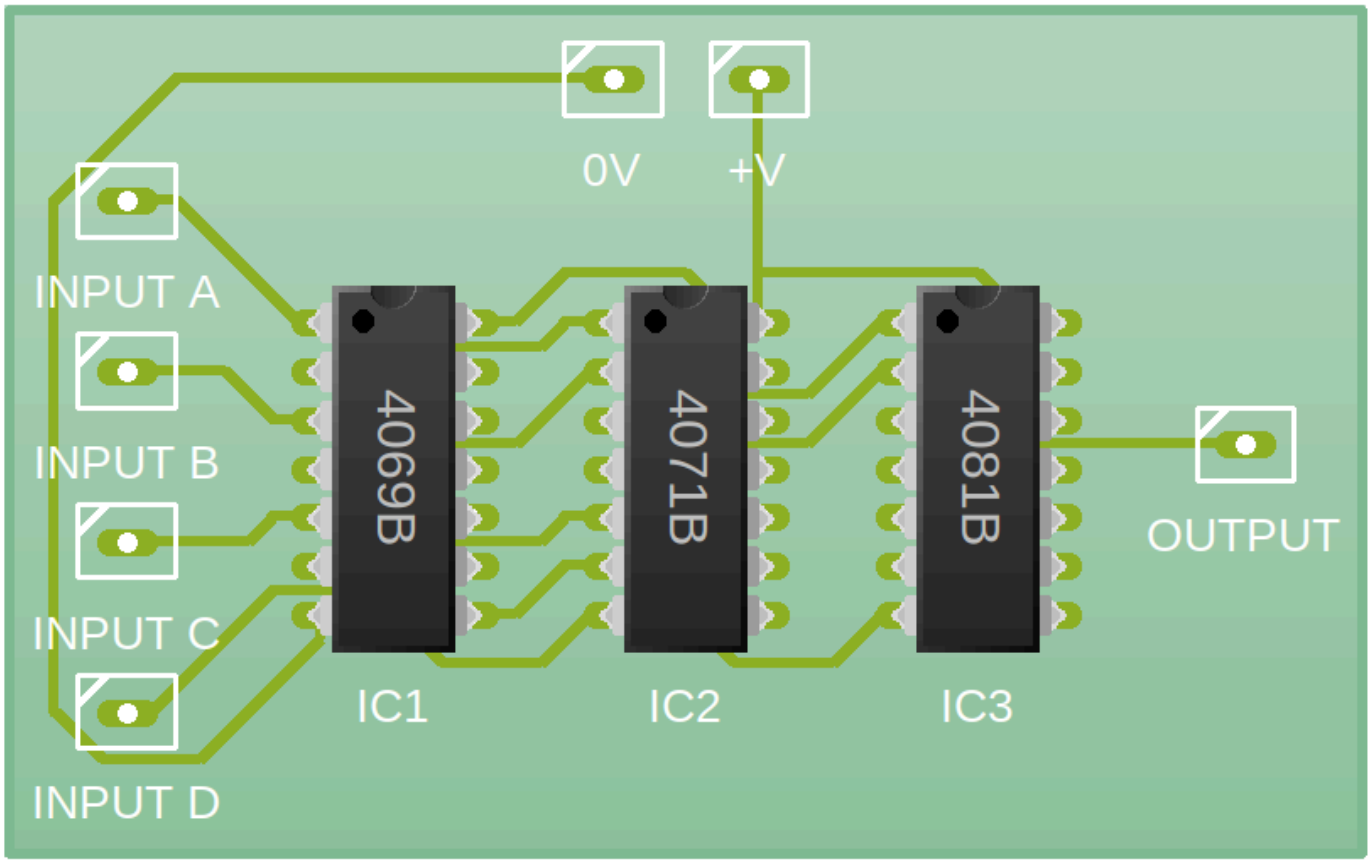
A	B	OUT
0	0	
0	1	
1	0	
1	1	

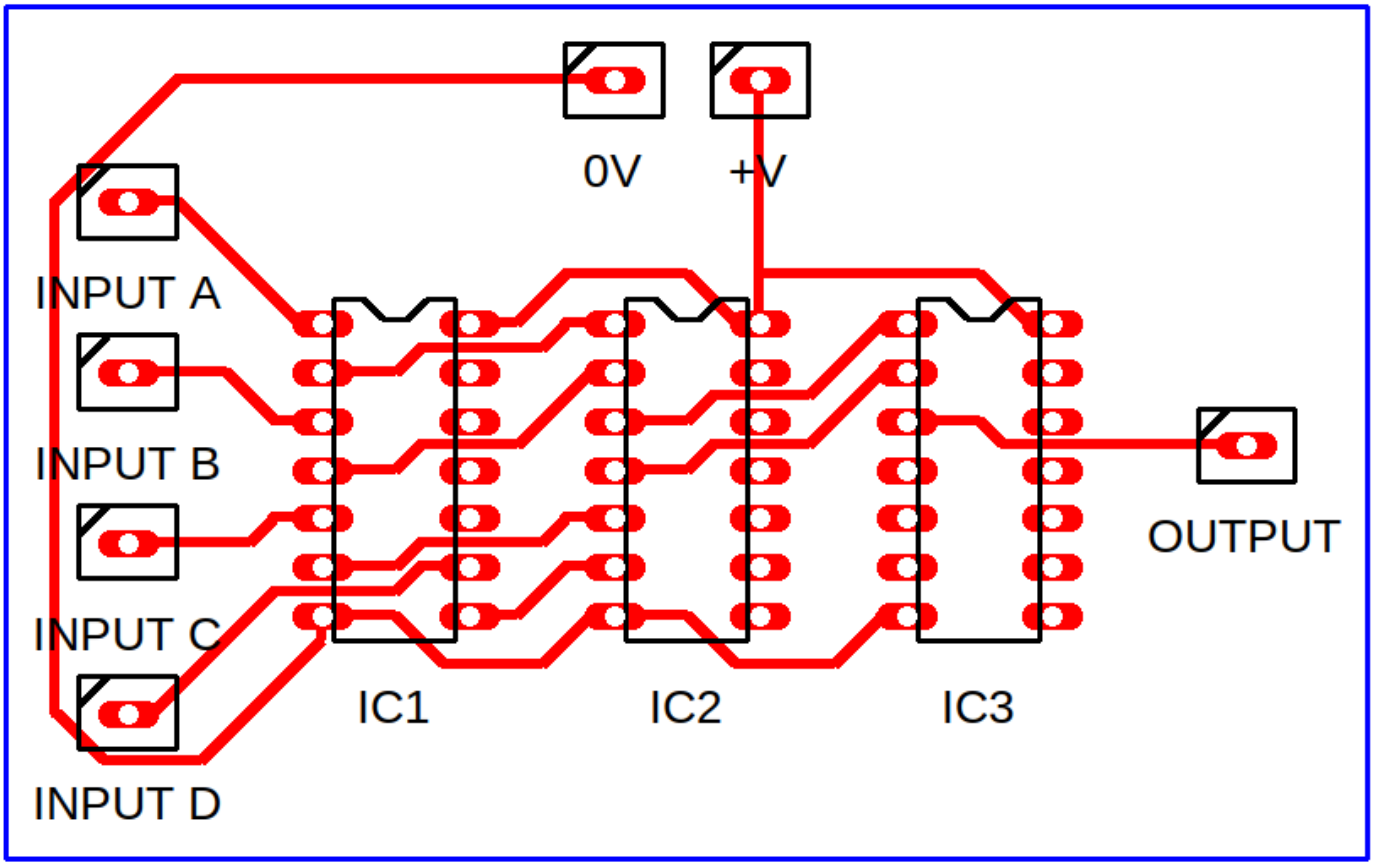
[4 marks]

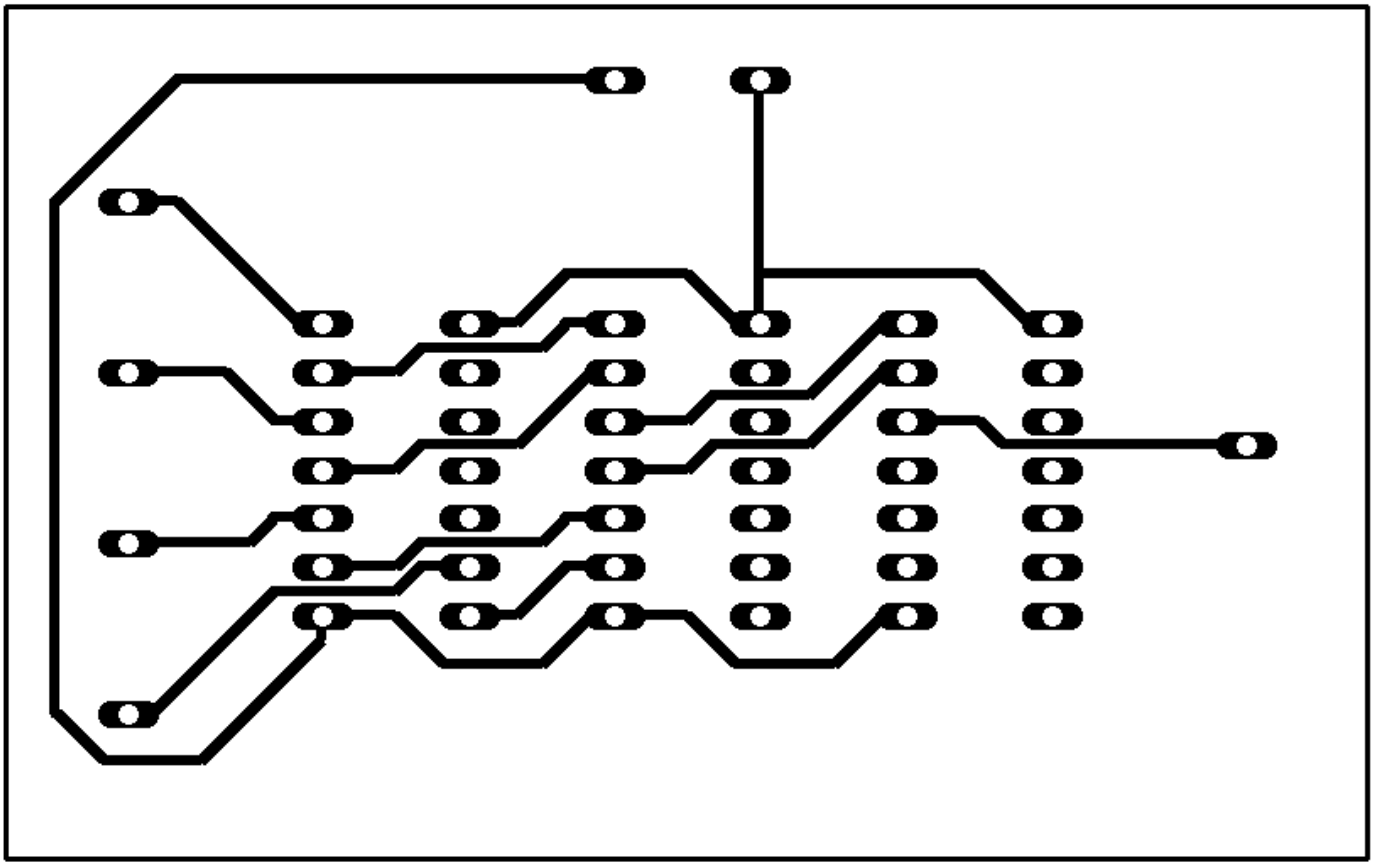
6) What single gate could be used to replace these 4 gates:

[1 mark]

PCB Layout:


0V
+V
INPUT A
INPUT B
INPUT C
INPUT D
4069B
4071B
4081B
OUTPUT
IC1
IC2
IC3


0V
+V
INPUT A
INPUT B
INPUT C
INPUT D
OUTPUT
IC1
IC2
IC3



Pinouts:

AND (4081)	OR (4071)	NOT (4069)