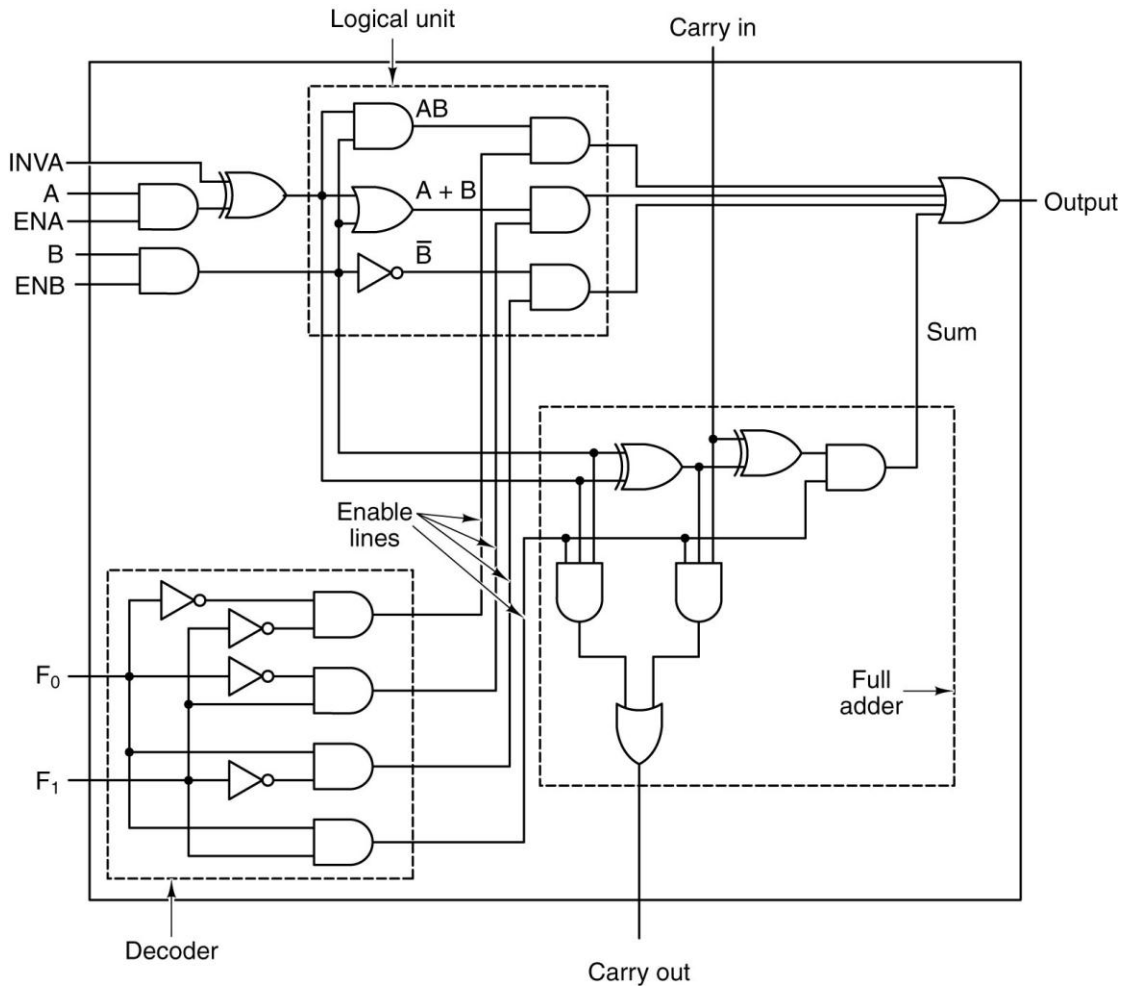
Name_____ _____ **Score**_____

1. **Multiple Choice questions**. For each of the questions (question number on the left column of the table below), five solutions are given (represented in A, B, C, D, and E, listed on the right column of the table); **only one** gives the correct answer. In the following table, select and **circle** the answers for each multiple choice question.

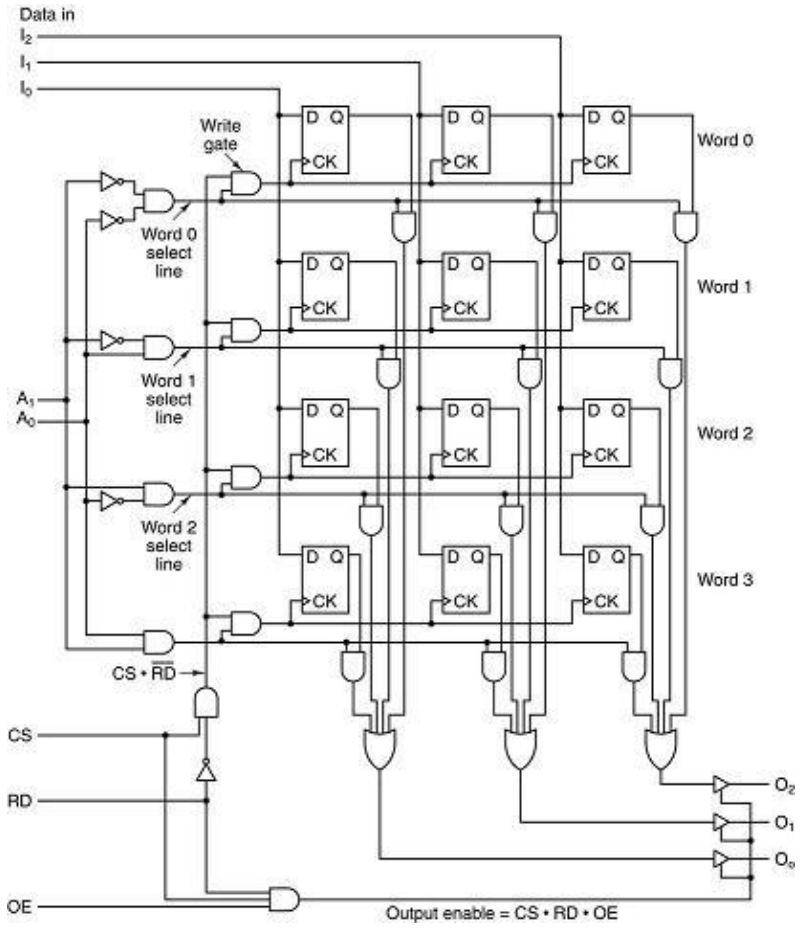
1	A B C D E	**21**	A B C D E
2	A B C D E	**22**	A B C D E
3	A B C D E	**23**	A B C D E
4	A B C D E	**24**	A B C D E
5	A B C D E	**25**	A B C D E
6	A B C D E	**26**	A B C D E
7	A B C D E	**27**	A B C D E
8	A B C D E	**28**	A B C D E
9	A B C D E	**29**	A B C D E
10	A B C D E	**30**	A B C D E
11	A B C D E	**31**	A B C D E
12	A B C D E	**32**	A B C D E
13	A B C D E	**33**	A B C D E
14	A B C D E	**34**	A B C D E
15	A B C D E	**35**	A B C D E
16	A B C D E		
17	A B C D E		
18	A B C D E		
19	A B C D E		
20	A B C D E		

2 The following diagram is used to illustrate how a simple (yes, really simple) CPU (ALU & CU) works. Provide short answers to the following questions:



How does this MINI/crude "CPU" works…Instructions, operations, "CU", "ALU"…

3 The following is a diagram for a 4x3 memory. $I_0I_1I_2$ are data inputs; A_1A_0 are used for memory address selection; ***RD* is for Read (when *RD* =1) and Write (when *RD* =0)** control; *CS* and *OE* are always 1 (selected); $O_0O_1O_2$ are output bits (the propagation delays of the logic gates can be ignored because we are testing the circuits in time of seconds or minutes).



Fill out the following table (if the contents cannot be determined, put "**N/A**" in the box).

Inputs				**Memory/Output**				
Time	**RD**	**A_1A_0**	**$I_0I_1I_2$**	**Word0**	**Word1**	**Word2**	**Word3**	**$O_0O_1O_2$**
T_0	0	01	001					**N/A**
T_1	1	10	111					
T_2	0	11	101					
T_3	0	10	011					
T_4	1	01	110					
T_5	0	10	111					
T_6	1	01	100					

4. Binary/Oct/Hex representations and conversion. 2's complement representation. Addition/subtraction OVERFLOW.

5.LMC instructions/program: given an LMC program, tell what it does; write simple LMC code

6. Assemble language/instructions introduced in the textbook.

7.Logic circuit: AND, OR, NOT, XOR, true tables,

8. Neural network: weights, weighted sum, threshold, input/output.

9. Ethernet/router/bridge/switch, TCP/UDP, URL and EMAIL, CSMA/CD, CSMA/CA

10. Computer graphics: Z-buffer, project plane, image window, refraction, reflection, specular light, diffuse light, ambient light, clipping, viewing volume, 3 steps in producing image using 3D graphics.

11. Turing machine: given a Turing machine (table) describe its function.

12. Given a Bare Bones program, what it does it do?

13. What is NP?

14. von Neumann machine: how it works.

15. Memory address space/capacity.

16. AND, OR, XOR, NOT byte operation.

17. AI search, 8-puzzle (heuristic);

18. AI: first order logic: translate English to FOL….

19. Big-O

20. IEEE 754 single-precision floating number: given 136D3000 to find its decimal value; give a decimal number, find its IEEE 754 (single-precision) representation.

21. Given a sequential circuit, provide a state table.

22. Embedded system: metrics: unit cost, NRE, per-product cost.

23. Moore's law.

24. Distributed system: Mutual Exclusion, Atomicity, Migration

25. Internet ISP addressing block: given a /26, how many computers for this subnet?

26. Fuzzy logic questions---make sure you understand the assignment question.

27.Decode the bit pattern **01110110** using the following floating-point format (the exponent is encoded with excess 4 method). And convert -13/32 to such a floating-point format.