

Final Exam**Name:****This exam is 9 pages long and has 5 questions.**

You must show all of your work -- partial credit may be given to partially correct answers, while answers with no justification may not receive full points. Use the back of the exam sheets if you need extra space.

1) a) (5pts) Name the programmer visible registers which were expanded to 32-bits with the introduction of the 80386.

b) (5pts) Give an example of one flow-of-control instruction that makes use of status bits in the EFLAGS register.

c) (10 pts) Briefly explain how the segment registers, e.g. CS, DS, etc. are interpreted in Real mode. Briefly explain how they are interpreted in Protected mode.

2) a) (6 pts) Name the three types of “logical” sections (segments) that compose a running program (or process).

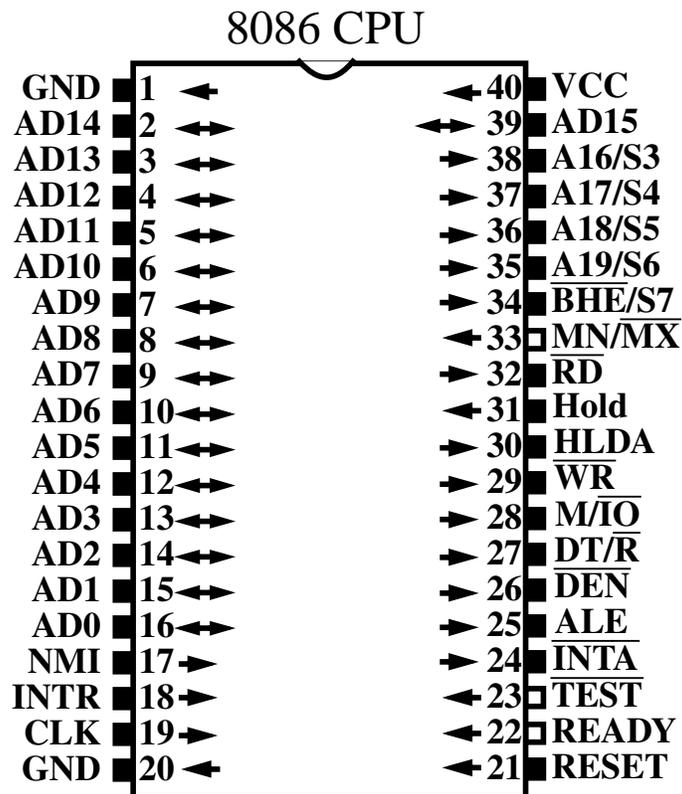
b) (5 pts) Briefly explain (two words are sufficient) the main purpose of Paging (what is it designed to improve?).

c) (4 pts) Name four of the eight data addressing modes available on the Pentium.

d) (5 pts) Give the floating point instruction that reads an integer value from memory, converts it into floating point and stores it on the top of the coprocessor stack.

e) (5 pts) Give the floating point instruction that computes $ST = ST - ST(1)$, where ST and $ST(1)$ are the stack top and stack register immediately below the stack top.

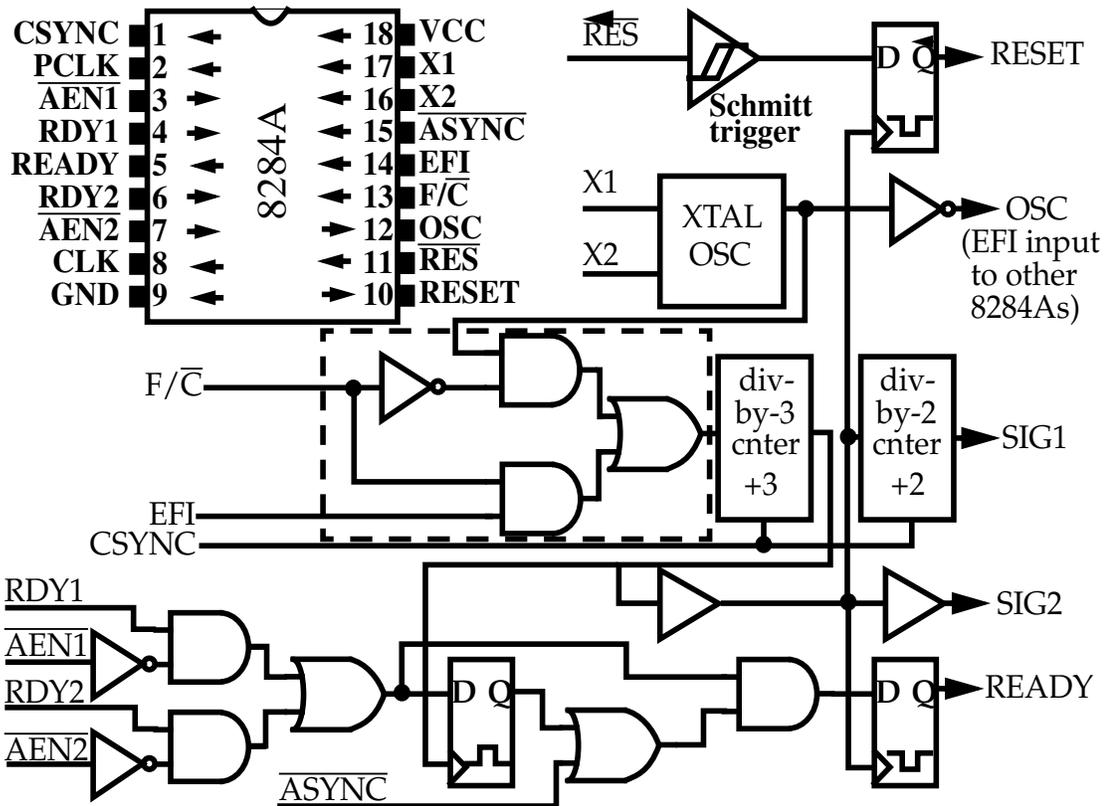
3)



a) (5 pts) Briefly explain how the $\overline{\text{RD}}$ and $\overline{\text{WR}}$ pin values are used in a running system.

b) (5 pts) Identify the three purposes of AD0 through AD15.

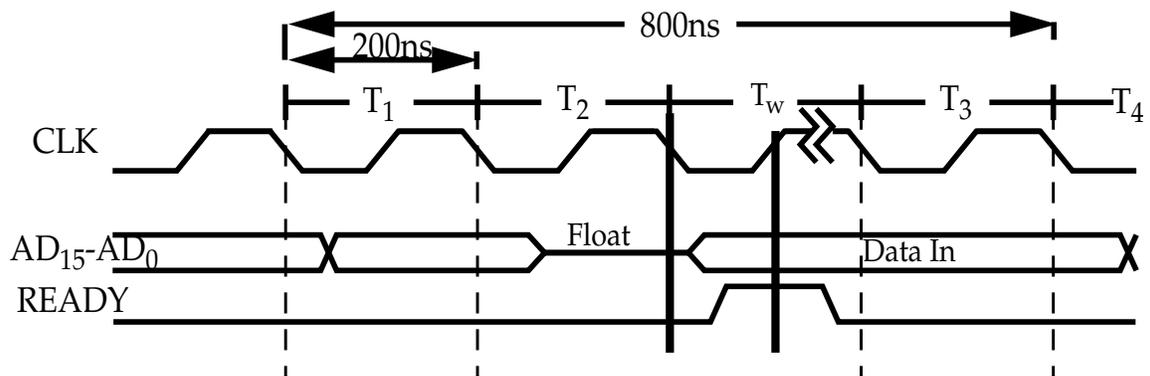
3) (cont)



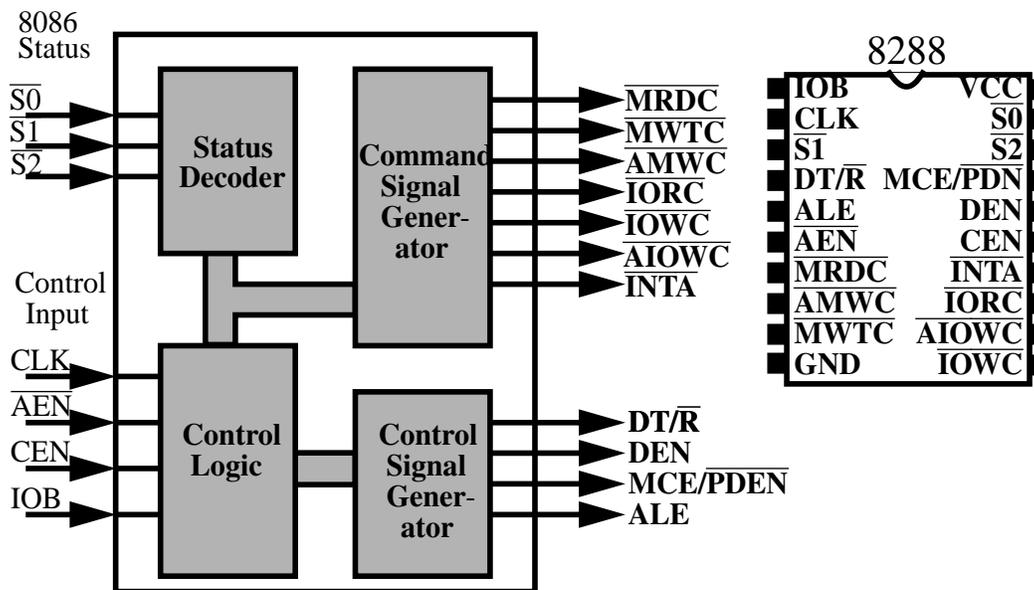
c) (5 pts) If X1 and X2 are driven externally by a 15MHz crystal, what are the frequencies of SIG1 and SIG2 in the above diagram? What do they drive?

d) (5 pts) What is the purpose of the circuit surrounded by the dotted line?

4)

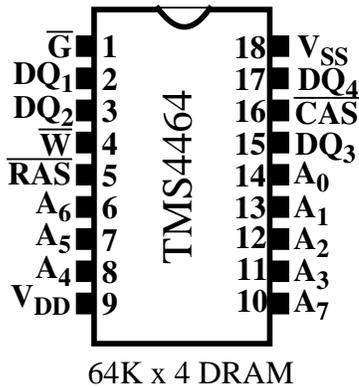


a) (5 pts) Briefly explain the actions of the microprocessor and memory given the timing diagram shown above. Focus on the events that occur in the region around the thick black vertical lines.



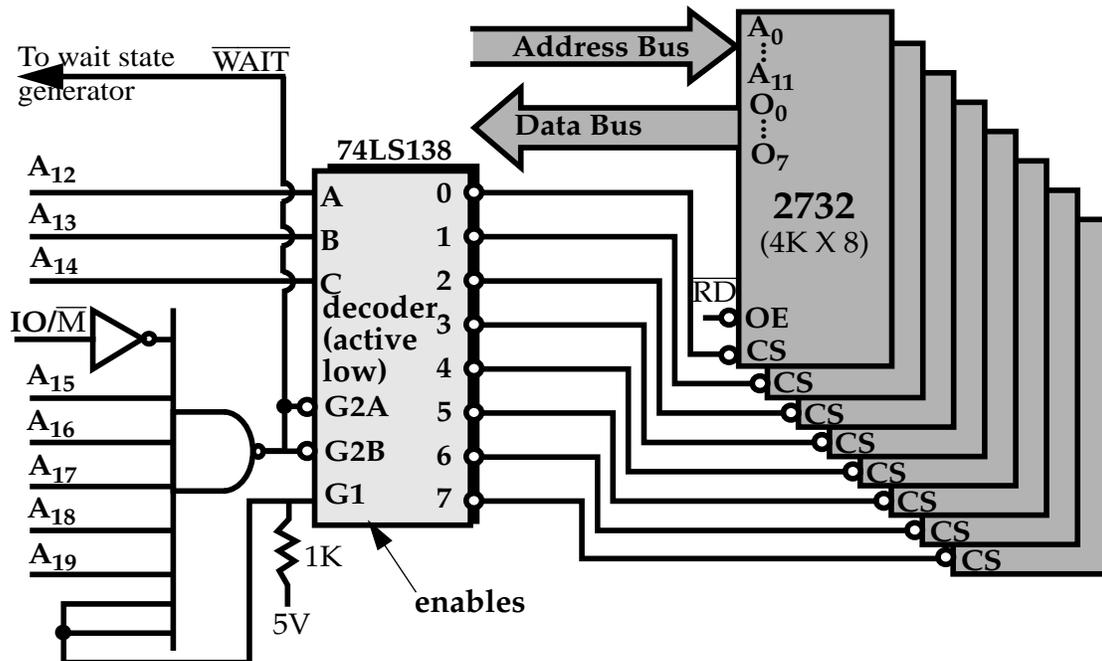
b) (5 pts) Briefly explain the purpose of the 8288 Bus Controller, e.g. when is it present in a system and why is it needed?

4) (cont)



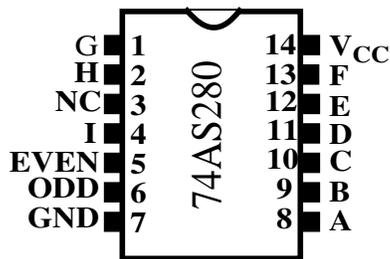
Pin(s)	Function
A ₀ -A ₇	Address
DQ ₀ -DQ ₄	Data In/Data Out
RAS	
CAS	
G	Output Enable
W	Write Enable

c) (5 pts) Define RAS and CAS and briefly explain (in words) how these pins are used to read and write the DRAM device shown above.



d) (5 pts) Using the information given above, give the address range that the 8 2732s span.

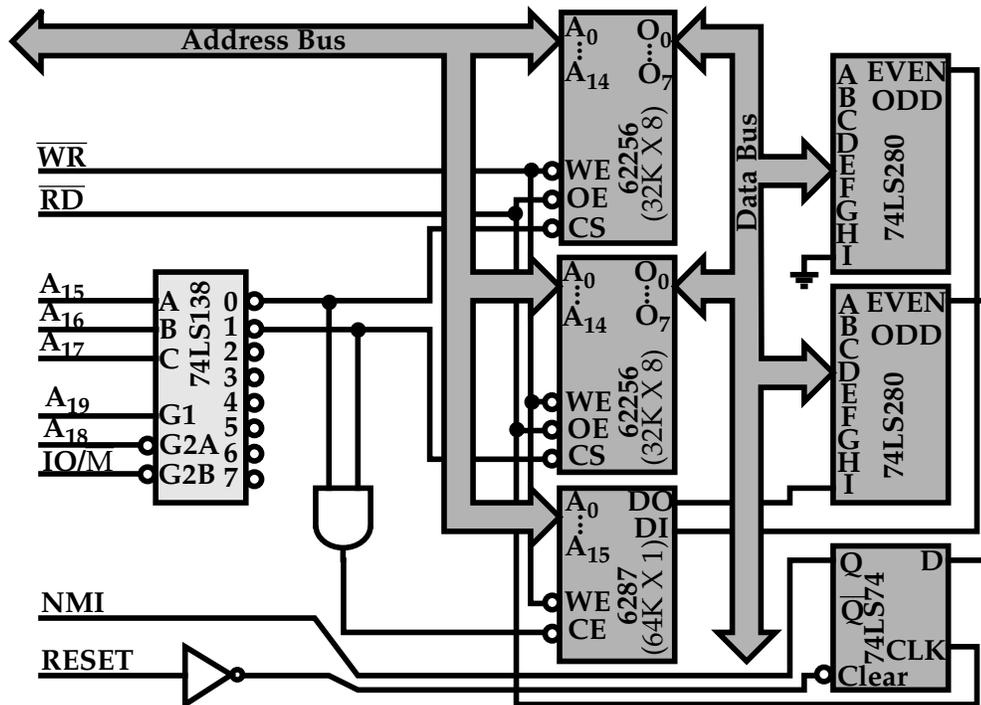
5)



9-bit parity generator/checker

Number of inputs A thru I that are HIGH	Outputs	
	EVEN	ODD
0, 2, 4, 6, 8	H	L
1, 3, 5, 7, 9	L	H

a) (5 pts) How is the 74AS280 used to generate parity, e.g. what are the pins A through I connected to?



b) (5 pts) BRIEFLY explain how a Non-Maskable Interrupt (NMI) signal is generated using \overline{RD} , Clk, the parity checker and the 6287 DI/DO pins in the diagram given above.

5) c) (5 pts) Given 4 hex data bytes: 10, 23, 45 and 04 to transmit to a receiver, compute the sum (in hex), the checksum, and the sum at the receiver.

EXTRA CREDIT (5 pts) Why is this course important for Computer Engineers? (Note: "It isn't" is not an acceptable answer).