BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE PILANI, Hyderabad Campus
II SEMESTER 2015-2016
CS/ECE/EEE/INSTR F241 MICROPROCESSOR PROGRAMMING AND INTERFACING
TEST II (OPEN BOOK)
TIME: 60 Min. **09/04/2016** **MM: 45**

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1. Design an 80286 based system that has the following memory requirements:

- 6MB of ROM and the rest is RAM
- 2MB of the ROM - mapped to address space starting at 00 00 00_H
- Rest of the ROM mapped to address space starting from A0 00 00_H
- 2MB of RAM is mapped from address E0 00 00_H.
- Rest of the RAM mapped to address space starting from 20 00 00_H

Chips available:

512K ROM chip	16 nos.
512K RAM chip	24 nos.
LS138	4 nos.

Show the complete memory mapping and design the memory decoding circuit ***using only the chips given***. Indicate all the system bus signals (MEMR', MEMW', IOR', IOW' BHE', A_0- A_{23}, $D_0 - D_{15}$). **Use absolute addressing and separate decoders for odd and even memory banks.** **[25]**

2. (a) Indicate the machine cycles (in sequence) required to execute the instruction given below.

ROR BYTE PTR [4050H], CX (CX has a count of 5).

(b) Compute the duration (in secs) of the complete Bus Cycle for the given instruction. Assume the clock frequency is 12 MHz and three wait states are inserted in each machine cycle. **[2+4]**

3. Write at least three possible ways to disable the Interrupt flag? **[4]**

4. (a) Connect 8 LEDs to Port C of 8255 PPI and make all the even numbered LEDs to glow first and after some delay, make all the odd numbered LEDs to glow. (Assume the base address of 8255 PPI is $\mathbf{A0_H}$ and LEDs are numbered as $L_0 - L_7$).

(i) Write a program to make the LEDs to glow in the given pattern.

(ii) Draw the complete hardware interfacing diagram depicting the 8086 processor, 8255, LEDs and the address lines used for chip selection.

(b) Extract the control word required to configure the 8253 timer as per the specifications given below:
Counter 1 in mode 2, count in binary and specify that an 8-bit count is written with MSB.
[4+4+2]

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