

Birla Institute of Technology and Science, Pilani- KK Birla Goa Campus  
II Semester 2015-2016  
EEE/CS/INSTR F241/ Microprocessor Programming and Interfacing  
Comprehensive Examination- Part A (Open Book)

Time: 60 min.

Date: 6-5-2016

MM: 30

**(Note: Answer Part A on the Q-Paper itself and Part B on a separate answer sheet provided.)**

| ID No.: | Name: | Section |
|---------|-------|---------|
|---------|-------|---------|

**Q1.** Give two possible opcodes for the following instruction running on 8086: MOV AX, [2345<sub>H</sub>]

A1 45 23

8B 06 45 23

[3]

**Q2.**  $V_{REF+}$  of ADC 0808 is connected to 4.0 V and  $V_{REF-}$  is connected to 0V. What will the minimum voltage difference that can be detected using ADC 0808. [2]

**15.625mV**

**Q3.** In 80486 DX based system 8255 is connected to data lines D<sub>0</sub>-D<sub>7</sub>. The starting address of 8255 is 30<sub>H</sub>. What will the address of Port A, Port B, Port C and the control Register? [2]

**Port A- 30<sub>H</sub>, Port B – 34<sub>H</sub>, Port C – 38<sub>H</sub> , Control Register – 3C<sub>H</sub>**

**Q4.** How many 8259's are required for 64 Interrupt Inputs? [2]

**9**

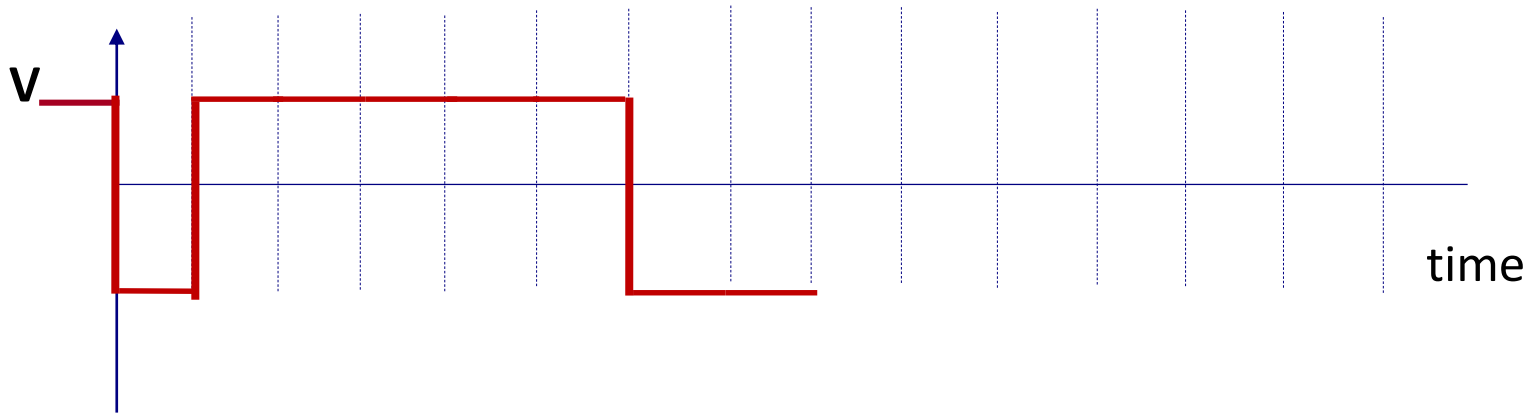
**Q5.** What is the maximum amount of memory required for storing the GDT? [1]

**64k**

**Q6.** The descriptor of an 80286 Processor stored in the GDT is as follows **00 00 B1 32 00 00 3F FF<sub>H</sub>** [From MSB onwards] Answer the following questions with respect to this descriptor **[1+1+1+1]**

- (i) Starting address of the Segment is 32 00 00<sub>H</sub>
- (ii) Size of the segment is 16K
- (iii) The minimum CPL and RPL required to access this segment 01
- (iv) Is the segment code or data segment? Data

**Q7.** The data 0011 1101 has to be transmitted via USB bus. Draw the NRZI encoded data pattern for the data. Assume that initially data is at high state. **[4]**



**Q8.** Write an Assembly language program segment to do the following function: JC 3FFH **[3]**

```
JNC X1
JMP 3FFH
```

X1:

**Q9.** If INTR is raised during a DIV instruction execution and the DIV instruction results in a divide by 0 interrupt – what will be the order in which the interrupts are serviced? **[1]**

**INT0 followed by INTR**

**Q10.** If the DPL of a call gate is 10 and the RPL of the selector within the Call gate is 00 – what should the minimum CPL and RPL of the selector if an application task wants to use the call gate? **[1]**

**10**

**Q11.** Which type of cache miss is reduced in set associative caches when compared to direct-mapped caches? **[1]**

**Conflict Miss**

**Q12.** If the cache access time is 5ns, the access of main memory is 25ns and we require an average memory access time of 10ns. What should be the hit rate of the cache? [assuming that there is only one level of cache in the system.] **[3]**

**75%**

**Q13.** Write a sub-routine that can be used for transferring data from HDD to memory location using DMAC 8237. The starting address of the DMAC is 80H. The HDD uses burst transfer of up to 1K of data/burst. The starting address of memory location to which the transfer must be done is 06000H. DMA channel 0 is used by HDD- HDD DREQ is active high, DACK is active low. **[3]**

|              |            |                      |
|--------------|------------|----------------------|
| <b>CH0</b>   | <b>EQU</b> | <b>80H</b>           |
| <b>CH0C</b>  | <b>EQU</b> | <b>82H</b>           |
| <b>MR</b>    | <b>EQU</b> | <b>96H</b>           |
| <b>CR</b>    | <b>EQU</b> | <b>90H</b>           |
| <b>MASKS</b> | <b>EQU</b> | <b>9EH</b>           |
| <b>CFF</b>   | <b>EQU</b> | <b>98H</b>           |
|              | <b>MOV</b> | <b>AL,01</b>         |
|              | <b>OUT</b> | <b>CFF,AL</b>        |
|              | <b>MOV</b> | <b>AL,00</b>         |
|              | <b>OUT</b> | <b>CH0,AL</b>        |
|              | <b>MOV</b> | <b>AL,60H</b>        |
|              | <b>OUT</b> | <b>CH0,AL</b>        |
|              | <b>MOV</b> | <b>AL,0FFH</b>       |
|              | <b>OUT</b> | <b>CH0C,AL</b>       |
|              | <b>MOV</b> | <b>AL,03H</b>        |
|              | <b>OUT</b> | <b>CH0C,AL</b>       |
|              | <b>MOV</b> | <b>AL,10000100B</b>  |
|              | <b>OUT</b> | <b>MR,AL</b>         |
|              | <b>MOV</b> | <b>AL,0EH</b>        |
|              | <b>OUT</b> | <b>MASKS,AL</b>      |
|              | <b>MOV</b> | <b>AL,0000 0000B</b> |
|              | <b>OUT</b> | <b>CR,AL</b>         |

Recheck Request