

Code No: 07A5EC01

**R07****Set No. 2****III B.Tech I Semester Examinations, November 2010****COMPUTER SYSTEM ORGANIZATION****Electrical And Electronics Engineering****Time: 3 hours****Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. (a) What is polling? Explain in detail how it can be used for interprocessor arbitration.  
 (b) Explain the organization of tightly coupled multiprocessor system with a generic block diagram. [8+8]
2. (a) Compare RISC and CISC characteristics.  
 (b) Write microoperations for PUSH and POP. [8+8]
3. (a) Define instruction, instruction code and operation code.  
 (b) Discuss Instruction Set Completeness. [8+8]
4. (a) What is memory hierarchy? And explain the need for it.  
 (b) What is virtual memory? Define and differentiate virtual or logical address and physical address.  
 (c) What is the necessity of memory management? [16]
5. (a) Derive the circuit for a 3 bit parity generator and 4 bit parity checker using an even parity bit.  
 (b) Determine whether the following 2's complement notations stand for positive or negative numbers. Give their values in decimal numbers.  
 i. 01110000  
 ii. 11001111  
 iii. 10001111  
 iv. 01010101 [8+8]
6. Explain the following related to Instruction pipeline  
 (a) Data dependency  
 (b) Handling of branch instructions. [8+8]
7. Write in detail about the design of hard wired control unit. [16]
8. Design a parallel priority interrupt with eight interrupt devices. [16]

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1. (a) Explain address sequencing in Microprogrammed control unit  
 (b) Explain in detail various fields of microinstruction format with diagram. [8+8]
2. (a) What are the different types of I/O communication techniques? Explain in brief.  
 (b) In the above techniques, which is the most efficient? Justify your answer. [8+8]
3. (a) Classify and explain different multiprocessors.  
 (b) What are the characteristic features of Multiprocessor systems? [8+8]
4. (a) Explain the operation of 4-bit adder-subtractor with example.  
 (b) Give hardware implementations to perform logic and shift operations. [8+8]
5. (a) Perform the arithmetic operations  $(+70) + (+80)$  and  $(-70) + (-80)$  in binary using signed 2's complement representation for negative numbers. Use eight bits to accommodate each number together with its sign and detect whether overflow occurs or not.  
 (b) Convert the hexadecimal number F3A7C2 to binary, octal and decimal. [8+8]
6. (a) Convert the following arithmetic expression into Reverse Polish Notation and show the stack operations for evaluating the numerical result.  
 $(3+4)[10(2+6)+8]$   
 (b) What are the differences between branch instruction, a call subroutine call instruction and program interrupt? [8+8]
7. (a) A block set-associative cache consists of a total of 64 blocks divided into 4-block sets. The main memory contains 4096 blocks, each consisting of 128 words.  
 i. How many bits are there in a main memory address?  
 ii. How many bits are there in each of the TAG, SET, and WORD fields?  
 (b) Explain the organization of a 1K x 1 memory with a neat sketch. [8+8]
8. (a) Draw a space-time diagram for a six-segment pipeline showing the time it takes to process eight tasks.  
 (b) Explain four possible hardware schemes that can be used in an instruction pipeline in order to minimize the performance degradation caused by instruction branching. [8+8]

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**R07****Set No. 1****III B.Tech I Semester Examinations, November 2010****COMPUTER SYSTEM ORGANIZATION****Electrical And Electronics Engineering****Time: 3 hours****Max Marks: 80**

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1. (a) What is meant by writable control memory and explain microprogram control organisation?  
 (b) Give the typical horizontal and vertical microinstruction formats. [8+8]
2. Explain three segment instruction pipeline. Show the timing diagram and also show the timing diagram with data conflict. [16]
3. Explain in detail about various instruction formats. [16]
4. (a) What is the parity bit and why we use it?  
 (b) What are fixed and floating point representations? Why do we go for floating point representation.  
 (c) What is mantissa and exponent? Give 2 examples. [5+6+5]
5. (a) When is the interrupt service routine for a device invoked? Upon the occurrence of an interrupt, how does the processor determine the memory address of the correct service routine. What is the status of interrupted program during and after interrupt.  
 (b) Which is the most efficient in the following?  
 i. Programmed I/O  
 ii. Interrupt Initiated I/O  
 iii. DMA  
 Justify your answer [8+8]
6. (a) Explain Flash Memory.  
 (b) Describe the two update policies that a cache can use. For each policy, give an example of a situation where it would be preferred. [8+8]
7. (a) Starting from an initial value of  $R=1101101$ , determine the sequence of binary values in  $R$  after a logical shift-left, followed by a circular shift-right, followed by a logical shift-right and a circular shift-left.  
 (b) Explain, why each of the following micro operations cannot be executed during a single clock pulse in the basic computer system with common bus. Specify a sequence of micro operations that will perform the operation.  
 $IR \leftarrow M[PC]$   
 $AC \leftarrow AC + TR$   
 $DR \leftarrow DR + AC$  [8+8]

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8. (a) What is the functioning of cross bar switch network? Explain with a neat sketch.
- (b) Discuss the differences between tightly coupled multi processors and loosely coupled multiprocessors. [8+8]

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1. Explain the following with applications for each:

- (a) ROM
- (b) PROM
- (c) EPROM
- (d) EEPROM [16]

2. Explain different techniques for interprocessor arbitration. [16]

- 3. (a) What is meant by Reverse Polish Notation for arithmetic expressions? Explain how to evaluate them using stack with an example.
- (b) Give examples for internal interrupts and external interrupts. What is the difference between a software interrupt and subroutine call? [8+8]

4. How many characters per second can be transmitted over a 1200-baud line in each of the following modes with a character code of 8 bits?

- (a) Synchronous serial transmission.
- (b) Asynchronous serial transmission with two stop bits
- (c) Asynchronous serial transmission with one stop bit [16]

- 5. (a) What is a bus? Construct a bus system using multiplexers.
- (b) List and explain arithmetic micro operations. [8+8]

6. (a) Give a summary of arithmetic and logical operations that are defined for the vector architecture.

- (b) Discuss different approaches to vector computation [8+8]

7. A computer has 16 registers, an ALU with 32 operations, and a shifter with eight operations, all connected to a common bus system.

- (a) Formulate the control word for a microinstruction.
- (b) Specify the number of bits in each field of the control and give a general encoding scheme.
- (c) Show the bits of control word that specify the microoperation  $RA \leftarrow R5 + R6$  [8+8]

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8. Convert:

- (a) 7562.45 to Octal
- (b) 1938.257 to Hexadecimal
- (c) 175.175 to Binary

[16]

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