

**AMIETE – CS/IT**

Time: 3 Hours

**DECEMBER 2014**

Max. Marks: 100

*PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.*

**NOTE:** There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

**Q.1 Choose the correct or the best alternative in the following: (2×10)**

a. A stack is

- (A) an 8-bit register in the microprocessor
- (B) a 16-bit register in the microprocessor
- (C) a set of memory locations in R/WM reserved for storing information temporary during the execution of computer
- (D) a 16-bit memory address stored in the program counter

b. Which of the following registers is used to keep track of address of the memory location where the next instruction is located?

- (A) Memory Address Register
- (B) Memory Data Register
- (C) Instruction Register
- (D) Program Counter

c. In immediate addressing the operand is placed

- (A) in the CPU register
- (B) after OP code in the instruction
- (C) in memory
- (D) in stack

d. The branch logic that provides decision making capabilities in the control unit is known as

- (A) controlled transfer
- (B) conditional transfer
- (C) unconditional transfer
- (D) none of these

e. How many address lines are needed to address each memory locations in a 2048 X 4 memory chip?

- (A) 10
- (B) 11
- (C) 8
- (D) 12

- f. Interrupts which are initiated by an instruction are
- (A) internal (B) external  
(C) hardware (D) software
- g. The addressing mode used in an instruction of the form ADD X Y, is
- (A) Absolute (B) Indirect  
(C) Index (D) None of these
- h. If the main memory is of 8K bytes and the cache memory is of 2K words. It uses associative mapping. Then each word of cache memory shall be
- (A) 11 bits (B) 21 bits  
(C) 16 bits (D) 20 bits
- i. In a program using subroutine call instruction, it is necessary
- (A) Initialise program counter (B) Clear the accumulator  
(C) Reset the microprocessor (D) Clear the instruction register
- j. In signed-magnitude binary division, if the dividend is  $(11100)_2$  and divisor is  $(10011)_2$  then the result is
- (A)  $(00100)_2$  (B)  $(10100)_2$   
(C)  $(11001)_2$  (D)  $(01100)_2$

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**Answer any FIVE Questions out of EIGHT Questions.**  
**Each question carries 16 marks.**

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- Q.2** a. What are the different performance measures used to represent a computer system's performance? (6)
- b. Explain Big-endian and Little-endian byte-addresses assignment with example. (6)
- c. Describe in brief the different generations of computer. (4)
- Q.3** a. Bring out the four key differences between subroutine and interrupt service routine. (4)
- b. Define addressing mode. With the help of example explain different addressing modes. (2+6)
- c. Explain stack organisation used in processors. Differentiate between a register stack and a memory stack. (4)
- Q.4** a. Explain in brief with the help of a diagram the working of daisy chaining with multiple priority levels and multiple devices in each level. (8)

- b. Define and explain the following (Any **TWO**): (2×4)
- Interrupt
  - Vectored Interrupt
  - Interrupt nesting
  - An exception and its two examples
- Q.5** a. What are the different kinds of I/O communication techniques? Compare and contrast. In the above techniques, which is the most efficient? Justify your answer. (8)
- b. Draw the block diagram of universal bus (USB) structure connected to the host computer. Briefly explain all fields of packets that are used for communication between a host and a device connected to an USB port. (8)
- Q.6** a. Give the organization of a 2M X 32 memory module using 512K X 8 memory chips. Explain the organization. (6+2)
- b. Explain the following mapping procedure:
- Direct mapping
  - Associative mapping (4+4)
- Q.7** a. Draw a flow chart to explain how addition and subtraction of two fixed point numbers can be done. Give an example to explain it. (8)
- b. Explain a method of translating virtual address of a program into physical address with the help of a diagram. (8)
- Q.8** a. Perform signed multiplication of -3 and 7 using booth multiplication algorithm. Represent the numbers in 5 bits including sign bit. Give booth multiplier recording table that is used in the multiplication. (10)
- b. Explain restoring division algorithm with a diagram. (6)
- Q.9** a. Hard-wired control unit is faster than micro programmed control unit. Justify this statement. (4)
- b. Explain the variety of techniques available for sequencing of microinstructions based on the format of the address information in the microinstruction. (6)
- c. Explain time-shared common bus organization. (6)