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COMPUTER SCIENCE

(Major)

Paper : 3.2

(Computer Organization and Architecture)

Full Marks : 60

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

1. Choose the correct option : 1×7=7

   (a) In case of zero-address instruction method, the operands are stored in

   (i) registers

   (ii) accumulators

   (iii) push-down stack

   (iv) cache

(b) Which method of representation of numbers occupies large amount of memory than others?

   (i) Sign magnitude

   (ii) 1's complement

   (iii) 2's complement

   (iv) All of the above occupies same amount of memory

(c) The main virtue for using single bus structure is

   (i) fast data transfer

   (ii) error-free data transfer

   (iii) cost-effective connectivity and ease of attaching peripheral devices

   (iv) None of the above

(d) The instruction fetch ends with

   (i) placing the data from the address in MAR to MDR

   (ii) placing the address of the data into MAR

   (iii) completing the execution of the data and placing its storage address into MAR

   (iv) decoding the data in MDR and placing it in IR

(e) The small extremely fast RAMs are called as

   (i) cache

   (ii) heaps

   (iii) accumulators

   (iv) stacks

(f) A block of successive memory location that is accessible on a last-in, first-out basis is called

   (i) stack

   (ii) register

   (iii) program counter

   (iv) accumulator

(g) A microprogram is a microinstruction program which controls

   (i) input devices

   (ii) output devices

   (iii) functions of a CPU of peripheral controller of a computer

   (iv) None of the above

2. Answer the following questions :   2×4=8

(a) What is addressing mode?

(b) Represent (12·5) in 32-bit normalized floating-point format.

(c) Write two differences between SRAM an DRAM.

(d) What are two basic tasks performed by microprogrammed control unit?

3. Answer any *three* of the following questions :
                                    5×3=15

(a) Explain the functions of stack pointer and subroutine.

(b) What do you mean by micro-operation? Give brief introductions of different types of micro-operation.

(c) What is the function of a status register? What are the four-status register's flags? Write their functions.

(d) Write a short note on DMA.

(e) A computer has a main memory of size 16 megabytes and it is byte-addressable. The main memory is divided into the block of size 4 bytes. It also employs a cache memory of size 64 kilobytes. What will be the size of the tag field (in bits) if direct mapping is used?

4. Answer any *three* of the following questions :
                                    10×3=30

(a) Give brief descriptions of the functional units of a computer with the help of a diagram.

(b) Design an 8-bit ALU. Also explain about how operations are performed in an ALU.

(c) Briefly explain program-controlled I/O and interrupt-driven I/O techniques.

(d) What is an interrupt? How interrupts are enabled and disabled by a program? Briefly explain any two schemes used to handle interrupts from multiple sources.

(e) Explain any two mapping functions of cache memory.

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