Code No: D-2407/A/R16

FACULTY OF ENGINEEERING

B.E. (ECE) IV - Semester (AICTE) (Main) (New) Examination, September/October 2022

Subject: Computer Organization and Architecture

Time: 3 Hours **Max. Marks: 70**

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each Questions carries 14 Marks.
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
(iii) Missing data, if any, may be suitably assumed.

1. a) What is normalization and alignment in floating point arithmetic?
   b) Draw the Basic computer instruction formats.
   c) What are the advantages of stack organized computer?
   d) Write the differences between hardwired control and micro programmed control unit.
   e) Determine the number clock cycle that it takes to process 200 tasks in a six segment pipeline.
   f) Draw the timing diagram for destination-initiated transfer using handshaking.
   g) What do you mean by page fault? Which hardware is responsible for detecting the page fault?

2. a) Explain the process of floating point binary multiplication with a flow chart.
   b) Using Booth's Algorithm, show the step-by-step multiplication process for the following example (+15) x (-13). Assume 5-bit registers that hold signed numbers.

3. a) Draw the block diagram of control unit of a basic computer and explain.
   b) List the control function and micro operations needed to execute the following memory reference instructions in a Basic Computer:
      (i) LDA (ii) ADD (iii) BSA (iii) BSA (iv) ISZ

4. a) What is the need for addressing mode? Explain various addressing modes of general purpose computer.
   b) Draw and explain the space time diagram for a six-segment pipeline showing the time it takes to process eight tasks.

5. a) Draw the block diagram of an asynchronous communication interface and explain its Operation.
   b) Describe in detail how data is transferred using DMA. Draw necessary diagrams to support your explanation.

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6. a) Why page-table is required in virtual memory system? Explain different ways of organizing a page-table.

b) A two –way set associative cache memory uses blocks of four words. The cache can Accommodate a total of 2048 words from main memory. The main memory size is 128Kx32.

(i) Formulate all pertinent information required to construct the cache memory.

(ii) What is the size of the cache memory?

7. Write short notes on

a) CPU-IOP communication

b) Micro program sequencer

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