Roll No. | | | | | | | |

H

# TCS–404/TIT–404

## B. Tech. (CS/IT) (Fourth Semester)

## End Semester EXAMINATION, 2017

### COMPUTER ORGANIZATION

*Time : Three Hours* ] [ *Maximum Marks : 100*

**Note :** (i) This question paper contains *five* questions.

(ii) All questions are compulsory.

(iii) Instructions on how to attempt a question are mention against it.

(iv) Total marks assigned to each question are **twenty**.

1. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Explain three address instructions, two address instructions, one address instruction and Zero address instruction formats with an example of each.

(b) An instruction is stored at location 300 with its address field at location 301. The address field has the value = 400. A processor register R1 contains the number 200. Evaluate the effective address if the addressing mode of the instruction is :

(i) direct

(ii) immediate

(iii) relative

(iv) register indirect and

(v) index with R1 as index register.

(c) Answer the following questions :

(i) What is instruction pipelining ? How does it enhance the performance of computer ?

(ii) A micro programmed control unit has a support of 256 instructions each of which on an average takes 16 micro operations. The system has support of 16 flag conditions and 48 control signals. Horizontal micro programming is used in the system. Then what will be the length of the Control-word ?





2. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) (i) Write down the conditions for overflow in 2's complemented addition.

(ii) What are the ranges of 'n' bit signed number in 1's complement and 2's complement representation ?

(b) What is "Hit ratio" ? Draw a comparative discussion of various memory levels in computer memory hierarchy concept.

(c) Give brief notes on below mentioned topics :

(i) Shared memory multiprocessors

(ii) Input-Output Interface

3. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Explain the working of Micro-programmed control unit in detail with the help of suitable diagram.

(b) Answer the following :

(i) Write short note on — Virtual memory

(ii) Write short note on — RISC

(iii) Compare — Multiprocessors and Multicomputer

(iv) Write short note on — Principle of locality

(c) A hard disk is connected to a 2 GHZ processor through a DMA controller which works in burst mode. Assume that the initial set up of a DMA transfer takes 1000 clock cycles for the processor and DMA completion requires 700 clock cycles for the processor. The hard disk has a transfer rate of 4000 KB/sec and the average block size transferred is 16 KB. What fraction of the CPU time is free if the disk is transferring data ?

4. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) What is Cache Coherence Problem ? How can this problem be resolved ?

(b) A basic computer is starting to perform instruction ADD 100 I. Given preconditions are (values are hex decimals) :

PC = 190

AC = 3

M[100] = 200

M[190] = 9100

M[200] = FFFE

Instruction Format :

| | | |
|---|---|---|
| I (15) | OP-code (12-14) | Address (0-11) |





Describe what happens during the instruction cycle. Include all phases from fetch to execute.

(c) Answer the following question :

(i) Write IEEE standard floating point format for 32 bit representation and explain with an example.

(ii) Consider a pipeline with 5 stages. Assume the 1st stage takes 5 units of time, 2nd takes 2 units of time, 3rd takes 3 unit of time, 4th takes I unit of time and 5th takes 4 unit of time. Calculate the speed up factor of pipeline.

5. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) What do you mean by DMA ? Explain in detail the process of DMA transfer. State clearly the meaning of cycle stealing.

(b) Find the corresponding Sign Magnitude, 1's complement and 2's complement values of the given decimal values :(in 8 bit format)

(i) – 17

(ii) + 9

(c) Discuss any two Cache–mapping techniques.