



End Semester Examination

April / May 2018

Max. Marks: 100

Class: S.E.

Course Code: CE44 / IT42

Name of the Course: Computer Organization and Architecture

Duration: 180 Min

Semester: IV

Branch: Computer / IT

Instruction:

- (1) All questions are compulsory
- (2) Draw neat diagrams
- (3) Assume suitable data if necessary

Synoptic

Q No.		Max. Marks	CO
Q.1 (a)	What are the functions of the following registers? (I) PC (II) SP (III) MAR (IV) IR (V) MDR Synoptic : Function of each = 1 Mark. 1 Mark x Functions of 5 = 5 Marks.	05	CO3
Q.1 (b)	Give the difference between Paging and Segmentation. Synoptic : Any five differences = 5 Marks.	05	CO4
Q.1 (c)	Assume numbers are represented in 8-bit twos complement representation. Show the calculations of the following. (I) - 6 + 13 (II) - 6 - 13 Synoptic : 1. To find 6, -6, 13 and -13 in binary (1 Mark) $6_{10} = 00000110_2$ $-6_{10} = 11111010_2$ $13_{10} = 00001101_2$ $-13_{10} = 11110011_2$ 2. To find -6 + 13 = $7_{10} = 00000111_2$ (2 Marks) 3. To find -6 - 13 = $-19_{10} = 11101101_2$ (2 Marks)	05	CO2
Q.1 (d)	How does SRAM differs from DRAM? Synoptic : Any five differences = 5 Marks.	05°	CO4
Q.2 (a)	Write the Evolution of X86 Computers. Synoptic : 1. Explanation on evaluation of X86 computers = 10 Marks. 2. Keywords are 8080, 8086, 80286, 80386, 80466, Pentium series etc.	10	CO1

Q.2 (b)	<p>What are the designing performance issues? Explain any two in detail.</p> <p>Synoptic :</p> <ol style="list-style-type: none"> 1. Enlist issues (2 marks) 2. Explaining any 2 (8 Marks) <p style="text-align: center;">OR</p> <p>What are the Functional units of a computer system? Draw the block diagram of it and explain each block in brief.</p> <p>Synoptic :</p> <ol style="list-style-type: none"> 1. Enlist functional units (2 marks) 2. Block diagram (2 Marks) 3. Explaining functional units (6 Marks) 	10	CO1
Q.3 (a)	<p>Draw the flow chart of restoring division method and perform $23/5$ using the same method.</p> <p>Synoptic :</p> <ol style="list-style-type: none"> 1. Flowchart of Restoring Division Method (3 Marks) 2. Dividend = $23_{10} = 010111_2$ (1 Mark) 3. Divisor = $5_{10} = 0101_2$ (1 Mark) 4. Final Answer using Restoring - Quotient = $4_{10} = 0100_2$ Remainder = $3_{10} = 0011_2$ (5 Marks) <p style="text-align: center;">OR</p> <p>Represent the following in IEEE 754 single precision and double precision formats.</p> <p>(I) 178.1875_{10} (II) -0.0625_{10}</p> <p>Synoptic :</p> <p>(I) 178.1875_{10}</p> <ol style="list-style-type: none"> 1. Binary Number = 10110010.0011 (1 Mark) 2. Normalized Number = $1.0110010110011 \times 2^7$ (1 Mark) 3. Single Precision Representation = $0\ 1\ 0\ 0\ 0\ 0\ 1\ 1\ 0\ 0\ 1\ 1\ 0\ 0\ 1\ 0\ 0\ 0\ 1\ 1\ 0\ 0\ 0\ 0$ (1.5 Marks) 4. Double Precision Representation = $0\ 1\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 1\ 1\ 0\ 0\ 1\ 0\ 0\ 0\ 1\ 1\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0$ (1.5 Mark) <p>Synoptic :</p> <p>(I) -0.0625_{10}</p> <ol style="list-style-type: none"> 1. Binary Number = 0.0001 (1 Mark) 2. Normalized Number = 1.0×2^{-4} (1 Mark) 3. Single Precision Representation = $1\ 0\ 1\ 1\ 1\ 1\ 0\ 1\ 1\ 0\ 0\ 0\ 1\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0$ (1.5 Marks) 4. Double Precision Representation = $1\ 0\ 1\ 1\ 1\ 1\ 1\ 1\ 0\ 1\ 1\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0\ 0$ (1.5 Mark) 	10	CO2
Q.3 (b)	<p>Draw and explain the RISC and CISC architecture. What are it's design issues?</p> <p>Synoptic :</p> <ol style="list-style-type: none"> 1. Block diagram of RISC and CISC = 3 Marks. 2. Explanation and design issues = 7 Marks. 	10	CO3

Q.4 (a)	<p>Write the Microinstruction sequencing and execution concept with the help of an example.</p> <p>Synoptic :</p> <ol style="list-style-type: none"> 1. Microinstruction Sequencing with example = 5 Marks. 2. Microinstruction Execution with example = 5 Marks. 	10	CO3
Q.4 (b)	<p>Explain the working organization of Bipolar MOS.</p> <p>Synoptic :</p> <ol style="list-style-type: none"> 1. Diagram = 3 Marks. 2. Explanation = 7 Marks. <p style="text-align: center;">OR</p> <p>Find miss ratio and hit ratio using LRU and FIFO page replacement policy for the following referencing stream – 1 2 3 2 1 5 2 1 6 2 5 6 3 1 3 6 1 2 4 3. Consider i) Frame size = 3 ii) Frame size =4</p> <p>Synoptic :</p> <p>FIFO :</p> <ol style="list-style-type: none"> 1. Frame size =3 : Miss ratio = 14 / 20, Hit Ratio= 6 / 20 (2.5 Marks) 2. Frame size =4 : Miss ratio = 9 / 20, Hit Ratio= 11 / 20 (2.5 Marks) <p>LRU :</p> <ol style="list-style-type: none"> 1. Frame size =3 : Miss ratio = 11 / 20, Hit Ratio= 9 / 20 (2.5 Marks) 2. Frame size =4 : Miss ratio = 10 / 20 , Hit Ratio= 10 / 20 (2.5 Marks) 	10	CO4
Q.5 (a)	<p>Draw and explain the block diagram of an I/O module. Discuss the functions of I/O module.</p> <p>Synoptic :</p> <ol style="list-style-type: none"> 1. Block diagram of I/O module (2 Marks) 2. Explanation of block diagram (4 Marks) 3. Functions (4 Marks) <p style="text-align: center;">OR</p> <p>What is bus arbitration? Explain any two techniques of bus arbitration.</p> <p>Synoptic :</p> <ol style="list-style-type: none"> 1. Bus Arbitration mechanism (2 Marks) 2. Bus Arbitration techniques – Centralized, Distributed (2 x 4 Marks = 8 Marks). 	10	CO5
Q.5 (b)	<p>What is the concept of pipeline hazard? Explain Data Hazard and Control Hazard in detail.</p> <p>Synoptic :</p> <ol style="list-style-type: none"> 1. Concept of Pipeline hazard (2 Marks) 2. Explanation of Data Hazard and Control Hazard (2 x 4 Marks = 8 Marks). 	10	CO6