218

5E5101

Roll No. _____ [Total No. of Pages : 2

5E5101

B.Tech. V Semester (Main/Back) Examination, Nov./Dec. - 2017
Computer Science
5CS1A Computer Architecture
CS,IT

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

Instructions to Candidates :

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain Von-Neumann architecture in detail. **(8)**
   b) What is addressing mode? Explain the direct and indirect register addressing modes with suitable examples. **(8)**

OR

1. a) Explain the Flynn's classification of computer. **(8)**
   b) Explain the arithmetic micro-operation in register transfer language. **(8)**

Unit - II

2. a) Explain the differences between RISC and CISC computers. **(8)**
   b) Explain speed up, efficiency and throughput in pipelining. **(8)**

OR

2. a) Why do we require instruction pipelining? Explain its working procedure. Discuss the pipeline performance measures. **(8)**
   b) Draw and explain the organization of a CPU showing the connections between the register to a common bus. **(8)**

Unit - III

3. a) Using Booth algorithm. Multiply (+14) and (–12) when the number's are represented in 2's complement form. **(8)**
   b) Draw and explain flow chart for addition and substraction of floating points numbers. **(8)**

OR

3. a) Explain array multiplier with a suitable example. **(8)**

   b) Divide 0100100001 by 11001 using restoring division algorithms. Explain the steps. **(8)**

Unit - IV

4. a) Explain how virtual address is translated into real address in segmented memory system. **(8)**

   b) Briefly compare the mapping procedure used in cache memory organization. **(8)**

OR

4. Give the basic cell of an associative memory and explain its operation. Show how associative memories can be constructed using the basic cell with match logic. **(16)**

Unit - V

5. a) Describe the data transfer method using DMA. **(8)**

   b) What are the various modes of data transfer to and from the computers system? Explain. **(8)**

OR

5. Write short note on : **(2×8=16)**

   a) Priority interrupt

   b) IOP processor

220

5E 5102

Roll No. _____ [Total No. of Pages : 2

5E 5102

B.Tech. V Semester (Main & Back) Examination, Nov./Dec. - 2017
Computer Science and Engineering
5CS2A Digital Logic Design

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

Instructions to Candidates :

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain lexical elements of VHDL language with example. **(8)**
   b) Explain mixed style of modeling with example. **(8)**

OR

1. a) Describe the design steps of digital circuit using HDL. **(8)**
   b) Write down a behavioural style code for half subtractor. **(8)**

Unit - II

2. a) Explain different kinds of subprogram with examples. **(8)**
   b) Write the differences between package and entity. **(8)**

OR

2. Explain the following statements with one example in VHDL : **(16)**
   a) If statement
   b) Case statement
   c) Loops statement
   d) Generate statement

Unit - III

3. a) Write a VHDL code for serial adder circuit. **(8)**
   b) Write VHDL code for rising edge J-K flip-flop by using structural modeling. **(8)**

OR

3. a) Explain the following : **(4×2=8)**
   i) Clock skew
   ii) Metastable state
   iii) Hold Time
   iv) Set up time

   b) Write a short note on : **(4×2=8)**
   i) ROM
   ii) FPGA

Unit - IV

4. a) Define event driven circuits and write steps for designing these circuits. **(10)**

   b) What is meant by race-free assignments? **(6)**

OR

4. a) Explain in detail essential hazards and eliminating hazards. **(8)**

   b) Explain the procedure of state reduction of incompletely specified machine with a suitable example. **(8)**

Unit - V

5. a) Write short notes on : **(4×2=8)**
   i) SRAM
   ii) Flash Memory

   b) What is the importance of Altera static **(8)**

OR

5. a) Why should one prefer Xilinx Virtex-II PRO? **(8)**

   b) Explain the FPGA mapping flow with the help of flow diagram. **(8)**

222

5E5103

Roll No. _____ [Total No. of Pages : 2

5E5103

B.Tech. V Semester (Main/Back) Examination, Nov./Dec. - 2017
Computer Science
5CS3A Telecommunication Fundamentals
CS, IT

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

Instructions to Candidates :

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Draw and explain TCP/IP reference model in computer network communication. **(10)**

   b) Differentiate between Analog and Digital transmission. **(6)**

OR

1. a) What are lossless and lossy channels? Also explain transmission impairments in detail. **(8)**

   b) Explain sliding window protocols. **(8)**

Unit - II

2. a) Discuss channel allocation problem in MAC sublayer. **(8)**

   b) What is two dimensional parity check? **(8)**

OR

2. a) Compare and discuss the throughput of pure and slotted ALOHA. **(8)**

   b) What is HDLC in data link control? **(8)**

Unit - III

3. a) Explain 802.11 architecture. **(8)**

   b) What is virtual LAN? **(8)**

OR

3. a) Explain spanning Tree protocol in detail. **(8)**

   b) Explain Bluetooth Architecture & protocol stack. **(8)**

Unit - IV

4. a) What is multiplexing? Explain FDM & TDM in detail. **(10)**

   b) Discuss TDMA Burst structure. **(6)**

OR

4. a) What is switching? Explain space-time-space division switching in detail. **(10)**

   b) What is slip rate in digital terrestrial network. **(6)**

Unit - V

5. a) What is frequency hopping (FHSS)? (3)

   b) Differentiate between forward and reverse CDMA channel. **(8)**

OR

5. Write short notes on : **(8 × 2 = 16)**

   a) IMT – 2000

   b) Orthogonal code & Gold sequences

224

5E5104

Roll No. _____ [Total No. of Pages : 2

5E5104

B.Tech. V Semester (Main/Back) Examination, Nov./ Dec. - 2017
Information Tech.
5IT4A Database Management Systems
CS,IT

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

Instructions to Candidates :

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Explain advantage of DBMS over file system. **(8)**

   b) Discuss types of DBMS. **(8)**

OR

1. a) Draw and explain architecture of RDBMS. **(10)**

   b) Contrast between DDL and DML. **(6)**

Unit - II

2. Draw ER diagram of any one of the following and explain each component of this ER diagram.

   Library management system. **(16)**

OR

2. Inventory management system. **(16)**

Unit-III

3. Explain following operations in Relational algebra : **(4×4=16)**

   a) Selection

   b) Projection

   c) Join

   d) Rename

OR

3. a) Explain the difference between relational Algebra and relational calculus. **(8)**

   b) State the difference between tuple and Domain relational calculus. **(8)**

Unit-IV

4. Write SQL queries for following operations : **(4×4=16)**

   a) Create student registration table and insert records in it.

   b) Update records based on a key.

   c) Display name and Roll numbers of students who have scored more than 60% marks.

   d) Delete records and table.

OR

4. a) Explain Triggers with the help of suitable example. **(8)**

   b) Explain Aggregate operators. **(8)**

Unit - V

5. a) Explain functional dependencies with the help of suitable examples. **(10)**

   b) Discuss need of normalization. **(6)**

OR

5. a) Explain 3rd NF with suitable example. **(8)**

   b) Explain BCNF with suitable example. **(8)**

5E5105

Roll No. _____ [Total No. of Pages : 3

5E5105

B.Tech. V Semester (Main/Back) Examination, Nov./Dec. - 2017
Computer Science & Engineering
5CS5A Operating Systems
CS, IT

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

Instructions to Candidates :

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) What is operating system? Explain its types and services provided by operating system in detail. **(8)**

   b) Explain the architecture of operating system with neat and clean diagram. **(8)**

OR

1. a) What you mean by process and lifecycle of process. Explain context switching between two processes. **(8)**

   b) What you mean by thread? Explain kernel and user level thread. **(8)**

Unit - II

2. a) What you mean by scheduling? Why scheduling is required? Differentiate the Preemption & Non-Preemption Scheduling? **(8)**

   b) Write short notes on the following : **(2 × 4 = 8)**

      i) Fair share scheduling

      ii) Race condition

      iii) Critical section

      iv) Semaphore and mutex

OR

2. Consider the following four processes, with the length of the CPU burst time given in milliseconds. **(16)**

Process	Burst time (ms)	Arrival time (ms)
P0	15	0.0
P1	20	1.0
P2	3	2.0
P3	7	2.0

Consider the Shortest Remaining Time First (SRTF), Round Robin (RR) (Quantum = 5ms) scheduling algorithms. Illustrate the scheduling using Gantt chart. Which algorithm will give the minimum average waiting time?

Unit - III

3. a) What is deadlock? Explain the conditions and prevention of deadlock? **(4)**

b) What is deadlock avoidance? Explain banker's algorithm with following SNAPSHOT of a system? Resource A = 3, B = 14, C = 12 and D = 12 instances. If P1 request 1 0 2 1 resource instance It can be granted or not?**(12)**

	Allocation				Maximum				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

OR

3. a) What is memory allocation schemes? Explain with example. **(8)**

b) What is thrashing? What do you understand by degree of multiprogramming.**(8)**

Unit - IV

4. a) What you mean by paging? Explain the concept of demand paging with proper diagram. **(8)**

b) What is fragmentation? Differentiate between external and internal fragmentation. **(8)**

OR

4. Explain the FIFO, Optimal, LRU page replacement algorithm for the reference string. **(16)**

7 0 1 2 0 3 0 4 2 3 10 3.

Unit - V

5. a) Explain various disk scheduling algorithm in brief. **(8)**

   b) What are the various access methods for file system. **(8)**

OR

5. What do you mean by disk scheduling? Suppose the head of moving head disk is currently servicing s request at track 60. If the queue of request is kept in FIFO order. What is the total head movement to satisfy these requests for the following disk scheduling algorithm: **(16)**

   i) FCFS

   ii) SCAN

   iii) C-SCAN

REQUEST SEQUENCE	TRACK NUMBER
1	55
2	175
3	30
4	125
5	10
6	140

229

5E5108

Roll No. _____ [Total No. of Pages : 3

5E5108

B.Tech. V Semester (Main & Back) Examination, Nov./Dec. 2017
Computer Sc. & Engineering
5CS6.3A Information Theory and Coding

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

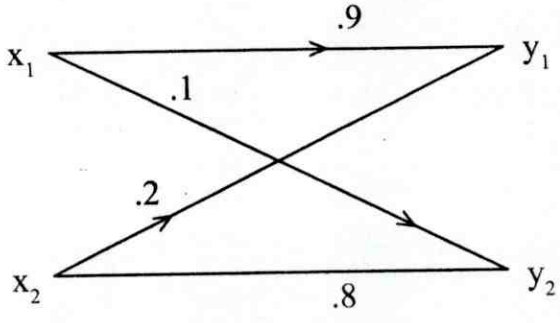
Unit - I

1. What is Entropy? Prove that $Y(X,Y) = H(X/Y) + H(Y) = H(Y/X) + H(X)$. **(16)**

OR

1. a) Consider a source x that produces five symbols with $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{16}$ probabilities. Determine source entropy H(X). **(8)**

b) Consider a discrete memory less binary channel shown in fig.



i) Find channel matrix of the channel.

ii) Find $P(y_1)$, $P(y_2)$ when $P(x_1) = P(x_2) = .5$

iii) Find $P(x_1, y_2)$ and $P(x_2, y_2)$ when $P(x_1) = P(x_2) = .5$ **(8)**

Unit - II

2. a) Construct a binary Huffman code of the following message. Find out its efficiency.

Message	Probability
m_1	.30
m_2	.25
m_3	.15
m_4	.12
m_5	.10
m_6	.08

Use binary differentiate set for encoding messages probabilities. **(8)**

b) A DMS has five symbols x_1, x_2, x_3, x_4, x_5 with $P(x_1) = 0.4$, $P(x_2) = 1.19$, $P(x_3) = 0.16$, $P(x_4) = 0.15$, $P(x_5) = 0.1$.

i) Construct a shanon-fano code for y and calculate the efficiency of the code.

ii) Repeat the Huffman code and compare the result. **(8)**

OR

2. Determine the Lempel Ziv code for following bit stream. 0100111111 00101 00000 101010110011 0000 Recover the original sequence from encoded stream. **(16)**

Unit - III

3. a) Explain the types of errors and classification of codes. **(8)**

b) Differentiate between systematic and non-systematic codes. Give example of each. **(8)**

OR

3. Consider a (6, 3) linear block code whose generator matrix is given by

$$\begin{bmatrix} 1 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 & 1 \end{bmatrix}$$

a) Find the parity check matrix.

b) Find the minimum distance of the code.

c) Draw the encoder and syndrome computation circuit. **(16)**

Unit - IV

4. Generate polynomial $g(x) = (x^2 + 1)$ is for ternary cyclic code (over GE(3)) y (4, 2) code.

   a) Calculate all possible codewords of this code.

   b) Let the polynomial $g(x) = x^{10} + x^7 + x^6 + x^5 + x^4 + x + 1$ is defined over GF(2). with x = 15 in a cyclic code. Find the Generator matrix G.

   c) Check whether the following code is a cyclic code {0000, 10110, 01101, 11011} over GE(2). **(16)**

OR

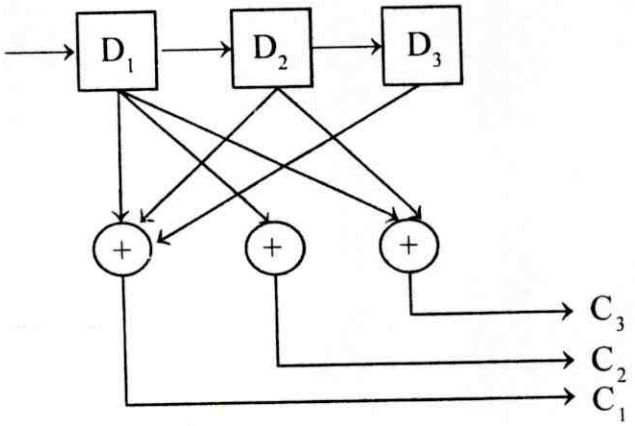
4. Write short notes on :

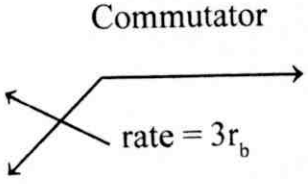
   a) Encoder & decoder for cyclic codes.

   b) Cyclic codes **(2 × 8 = 16)**

Unit - V

5. Convolution encoder is given below :





for above encoder explain the coding procedure and also generate the code tree.**(16)**

OR

5. a) Explain the coding and decoding in the convolution code. **(8)**

   b) Explain the viterbi algorithm. **(8)**

252

5E5106

Roll No. _____ [Total No. of Pages : 2

5E5106

B.Tech. V Semester (Main/Back) Examination, Nov./Dec. - 2017
Computer Science
5CS6.1A Advanced Data Structure
CS, IT

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

Instructions to Candidates :

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit - I

1. Define Red-black trees. What is "big-oh" performance for the operation find Insert and Remove for a Red-black tree in best, worst & average cases. **(16)**

OR

1. a) Explain the operations on weighted balanced trees in detail. **(10)**

   b) Write short note on Dynamic order statistics. **(6)**

Unit - II

2. Explain the implementation of a binomial heap and its operations with suitable example in detail. **(16)**

OR

2. Explain Amortization analysis and potential function of fibonacci heap along with implementation of fibonacci heap. **(16)**

Unit - III

3. Explain following in contrast to Graphs

   a) Cut sets **(5)**

   b) Vertices Planar & Dual graphs **(5)**

   c) Spanning Trees **(6)**

OR

3. a) Write and explain single Min-cut Max-flow theorems in Network flows. **(8)**

   b) Explain ford fulkerson max flow algorithm. **(8)**

Unit - IV

4. Explain the concept of priority queues and concatenable queues using 2-3 Trees along with suitable example. **(16)**

OR

4. a) Explain various operations on Disjoint sets and its union find problem. **(10)**

   b) Write short note on zero-one example. **(6)**

Unit - V

5. a) Explain notation of elementary number theorem also explain Division theorem. **(10)**

   b) Write short note on Chinese Reminder Theorem. **(6)**

OR

5. Write short notes on :

   a) Primality testing & Integer factorization. **(8)**

   b) Computation of Discrete logarithms. **(8)**

5E5107

Roll No. _____ [Total No. of Pages : 3

5E5107

B.Tech. V Semester (Main/Back) Examination, Nov./Dec. - 2017
Computer Science & Engineering
5CS6.2A Digital Signal Processing
CS IT

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

Instructions to Candidates :

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) What is system? Explain the basic properties of system. **(8)**

   b) The system gives below have input x[n] and output y[n] respectively. Determine whether each of them is **(8)**

   i) Stable

   ii) Causal

   iii) Linear

   iv) Time invariant $y(n) = 2 \times [n]\ U\ [n]$.

OR

1. a) Consider a causal LTI system whose input x[n] and output y[n] are related by the difference equation.

   $$y\ [n] = \frac{1}{4} y[n-1] + x[n]$$

   Determine y [n], if x [n] = f [n-1] **(8)**

   b) Obtain the convolution of the following sequences.

   $x\ (n) = U(n)$, $h(n) = 2^n\ U\ (n)$ **(8)**

Unit - II

2. a) Determine the Fourier transform of the following signal.

   i) $x(n) = U(n) - U(n-6)$

   ii) $x(n) = 2^n U[-n]$ **(8)**

   b) Define the z-transform. Explain the various properties of z-transform in brief. **(8)**

OR

2. a) Determine the inverse z-transform by using partial fraction expansion method.

$$x(z) = \frac{z}{\left(z-\frac{1}{2}\right)\left(z-\frac{1}{4}\right)}$$ **(8)**

   b) Discuss various properties of DTFT in brief. **(8)**

Unit - III

3. a) What is aliasing phenomenon? How can aliasing be eliminated **(8)**

   b) What is sampling process? Define and prove the sampling theorem. **(8)**

OR

3. Determine the Nyquist rate corresponding to each of the following signals.

   i) $x(t) = 1 + \cos(2000\,\pi t) + \text{Sin}(4000\,\pi t)$

   ii) $x(t) = \sin\frac{(4000\,\pi t)}{\pi t}$

   iii) $x(t) = \left(\frac{\sin(4000\,\pi t)}{\pi t}\right)^2$

   iv) $x(t) = \frac{1}{2\pi}\cos(4000\,\pi t)\cos(1000\,\pi t)$ **(16)**

Unit - IV

4. a) Given x[n] = {0, 1, 2, 3, 4, 5, 6, 7}. Determine DFT using DIT - FFT Algorithm. **(8)**

   b) Explain the properties of the DFT. **(8)**

OR

4. a) Compute 8-point DFT of x(n) = n+1 using DIT - FFT algorithm. **(8)**

   b) Define the convolution. Explain linear convolution. **(8)**

Unit - V

5. Obtain the Cascade and parallel form structure for

$$H(z)=\frac{\left(1-z^{-1}\right)^3}{\left(1-\frac{1}{2}z^{-1}\right)\left(1-\frac{1}{8}z^{-1}\right)} \qquad \textbf{(16)}$$

OR

5. Design the Chebyshev high pass filter for the following filter specification

pass band attenuations = 1 dB

stop band attenuations = 10 dB

pass band edge frequency = 0.6498 rad/sec

stop band edge frequency = 0.0314 rad/sec (16)