

END TERM EXAMINATION

FIFTH SEMESTER [B.TECH] DECEMBER-2014-JANUARY 2015

Paper Code: IT-305

Subject: Computer Architecture

Time: 3 Hours

Maximum Marks: 60

Note: Attempt any five questions including Q.no.1 which is compulsory.
Select one question from each Unit.

- Q1 Answer the following questions:- (10x2=20)
- (a) Differentiate between Hardwired control and Microprogrammed Control.
 - (b) Explain the cause of Stack overflow.
 - (c) ABCD- seven segment decoder/driver is connected to an LED display. Which segments are illuminated for the input code DCBA = 0001.
 - (d) What is pipeline register?
 - (e) How many 128*8 RAM chips are needed to provide a memory capacity of 2048 bytes?
 - (f) What is Excess 3 code?
 - (g) What is advantage of using Cache memory?
 - (h) What features designate 8085 as an 8 bit processor?
 - (i) What is shift register?
 - (j) What is the basic difference between computer organization and computer architecture.

Unit-I

- Q2 (a) Register A holds the 8-bit binary 11011001. Determine the B operand and the logic micro-operation to be performed in order to change the value in A to:
(i) 01101101 (ii) 11111101. (6)
- (b) Subtract the following using 2's complement.
(i) 1000011 from 10101010 (ii) 72532 from 3250. (2x2=4)
- Q3 (a) Design 4-bit common bus to transfer the contents of one register to other. (6)
- (b) Explain IEEE 754 floating point standard with example. (4)

Unit-II

- Q4 (a) Explain 8085 instruction set architecture. (5)
- (b) What do you understand by Fetch cycle, instruction cycle and machine cycle? (5)
- Q5 (a) Write a program to evaluate the arithmetic statement. (6)
- $X = (A + B) * (C + D).$
- (i) Using an accumulator type computer with one address instruction.
(ii) Using two and three address instructions and
(iii) Using stack-organized computer with zero address instructions.
- (b) Draw a block diagram of associative memory. (4)

Unit-III

- Q6 (a) Explain stack organization with an example. (5)
- (b) What do you mean by indexed addressing mode? (5)
- Q7 (a) What is parallelism and pipelining in computer architecture? (6)
- (b) Write a note on Pentium Processor. (4)

Unit-IV

- Q8 (a) Draw a block diagram of associative memory. (5)
- (b) What do you mean by memory hierarchy? Briefly discuss. (5)
- Q9 (a) What do you mean by Software and Hardware interrupts? How these are used in microprocessors? (6)
- (b) Explain RS-232-C. (4)

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END TERM EXAMINATION

FIFTH SEMESTER [B.TECH./M.TECH.] DECEMBER 2014-JANUARY-2015

Paper Code: IT301

Subject: Theory of Computation

Time : 3 Hours

Maximum Marks :60

Note: Attempt any five questions including Q.no.1 which is compulsory.

- Q1 (a) Discuss the applications of regular expressions.
(b) With the help of examples define Pumping lemma.
(c) Explain the disadvantages of ambiguous grammar.
(d) Define halting problem.
(e) Differentiate between NP complete and NP hard problem. (4x5=20)
- Q2 (a) Explain Chomsky classification using example for each classification. (5)
(b) Discuss the steps to convert a NFA to DFA. Provide example to support the steps. (5)
- Q3 (a) Discuss the closure properties of CFL. (5)
(b) Differentiate between LL(1) and LL(2) grammar. Provide example for both LL(1) and LL(2) grammar. (5)
- Q4 (a) Differentiate between Push down automata and Turing machine. (5)
(b) Verify that the language $L = \{w \in a^n b^n c^{2n}\}$ is context free or not. (5)
- Q5 Define Decidability. What are the factors to determine the decidability? How does turing machine helpful for decidability? Explain using an example. (10)
- Q6 (a) Define hierarchy theorem. Explain using an example. (5)
(b) Discuss and explain the various complexity classes. (5)
- Q7 Construct the regular expression for the following languages:- (5x2=10)
(a) Language that accepts exactly one combination of 0 and 1.
(b) Language that accepts any number of 1s at the starting of the language.
- Q8 Write short notes on any two of the following:- (5x2=10)
(a) Recursion Theorem
(b) Non-deterministic turing machine
(c) Interactive proof systems

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END TERM EXAMINATION

FIFTH SEMESTER [B.TECH./M.TECH.] DEC. 2014-JAN. 2015

Paper Code: IT303

Subject: Analog & Digital Communications

Time : 3 Hours

Maximum Marks :60

Note: Attempt any five questions including Q.no.1 which is compulsory.
Select one question from each unit.

- Q1 (a) Differentiate between Analog and Digital signals. Discuss pros and cons of these signals. Give atleast two application of each.
(b) Draw the Spectrum of Frequency Modulated signal and express the relation for bandwidth requirement.
(c) How do you avoid aliasing effect in sampled signals and show this effect pictorially?
(d) List the major demerits of Delta modulation and how these can overcome?
(e) What is entropy of a source, give the formula and explain the significance of this term in information theory?
(4x5=20)

UNIT-I

- Q2 Explain one of the methods to generate Standard AM signal (DSB, Full carrier), deduce the relation for bandwidth and represent the signal in time domain and frequency domain. (10)
- Q3 Discuss about the following two entities used for statistical analysis of Random signals:-
(a) Power Spectral Density (PDF)
(b) Autocorrelation Function
How these two parameters are interrelated? (10)

UNIT-II

- Q4 Describe Armstrong method to generate frequency modulated signal. Draw its spectrum. Discuss about bandwidth requirement of Narrowband and wideband FM signals. (10)
- Q5 Describe the generation and detection of Pulse width Modulation (PWM) signal. Draw all the relevant waveforms. (10)

UNIT-III

- Q6 What is quantization and quantization error? Obtain the relation for signal to Quantization noise ratio of uniform quantizer that is used to make the signal discrete in amplitude domain. Why non-uniform quantization is preferred over uniform quantization? (10)
- Q7 Draw and explain the block diagram to Generate QPSK signals over Binary PSK (BPSK) signals. Draw the constellation diagram for BPSK and QPSK. (10)

UNIT-IV

- Q8 A discrete Memory less source has an alphabet of eight letters with probabilities 0.25, 0.20, 0.15, 0.12, 0.10, 0.08, 0.05, 0.05. Use the Huffman encoding procedure to determine the binary code for the source output. (10)
- Q9 Write short notes on any two of the following:-
(a) Block codes
(b) Convolutional codes
(c) Significance of S/N ratio and Noise figure.
(2x5=10)

END TERM EXAMINATION

FIFTH SEMESTER [B.TECH./M.TECH.] DEC. 2014-JAN. 2015

Paper Code: IT307

Subject: Digital Signal Processing

Time : 3 Hours

Maximum Marks :60

Note: Attempt any five questions including Q.no.1 which is compulsory.

- Q1 Explain the following briefly:- (2x10=20)
- (a) Give the properties of Z-transformation.
 - (b) What is signal processing?
 - (c) Give some properties of DFT.
 - (d) Differentiate between FIR and IIR.
 - (e) Define Convolution.
 - (f) Why do we need FFT algorithms?
 - (g) What are the computational saving in using N point FFT algorithm?
 - (h) What are the advantages of FIR filters?
 - (i) Differentiate between DIT and DIF.
 - (j) Give some applications of DSP.
- Q2 (a) What are typical signals? Give some examples of typical signal. (5)
(b) Explain the time-domain LTI system with an example. (5)
- Q3 (a) Discuss the design procedure of FIR filter using frequency sampling method. (6)
(b) Give the block diagram representation of digital filter. (4)
- Q4 (a) Derive the butterfly diagram of 8 point radix 2 DIF FFT algorithm and fully label it. (6)
(b) How can we classify signals? (4)
- Q5 (a) Compute linear convolution of the two sequence $x(n)=\{1,2,2,2\}$ and $h(n)=\{1,2,3,4\}$. (6)
(b) Derive expressions to relate z-transfer and DFT. (4)
- Q6 (a) State and explain the scaling and time delay properties of z transform. (5)
(b) Describe different types of sampling methods. (5)
- Q7 (a) Explain the classification of discrete signals. (4)
(b) Determine the response of LTI system when the input sequence is $x(n)=\{-1,1,2,1,-1\}$ using radix 2 DIF FFT. The impulse response is $h(n)=\{-1,1,-1,1\}$. (6)
- Q8 (a) Give some approaches of reducing the computation of an algorithm. (4)
(b) An 8 point sequence is given by $x(n)=\{2,2,2,2,1,1,1,1\}$. Compute 8 point DFT of $x(n)$ by radix DIT-FFT method. (6)

END TERM EXAMINATION

FIFTH SEMESTER [B.TECH./M.TECH.] DEC. 2014-JAN.-2015

Paper Code: IT309

Subject: Object Oriented Software Engineering

Time : 3 Hours

Maximum Marks :60

Note: Attempt any five questions including Q.no.1 which is compulsory.

- Q1 Write short notes on any five of the following:- (4x5=20)
- (a) System testing
 - (b) Analysis model
 - (c) Software Development Life cycle
 - (d) Software quality assurance
 - (e) Software Metrics
 - (f) Requirement Model-Action and use-case.
- Q2 (a) Differentiate between the scenario and use cases. (5)
- (b) What are the activities involved during OOA phase? How the OOA is different from structured analysis? Provide the guidelines for an analyst during the OOA phase. (5)
- Q3 For hospital management system- (2.5x4=10)
- (a) Draw use-case model.
 - (b) Draw a sequence diagram for any one use case.
 - (c) Explain component diagram.
 - (d) Write use-case description of any one activity.
- Q4 (a) Describe the activities performed during requirement elicitation in detail. (5)
- (b) Differentiate between coupling and cohesion in detail. (5)
- Q5 (a) How do we differentiate between function and non-functional requirements? Give examples of each. (5)
- (b) Explain Entity class, interface class and control class in detail. (5)
- Q6 (a) Describe various diagrams we make in UML with example. (8)
- (b) What is an entity class? How it can be used in designing database structure? (2)
- Q7 (a) How do we identify the relationship between the entities? (5)
- (b) Explain following relationships with example:- (5)
- (i) Association
 - (ii) Aggregation
 - (iii) Composition
 - (iv) Dependency
 - (v) Generalization
- Q8 (a) Draw a class diagram for an employee having various attributes such as id, name, phone, email, street, city, basic sal, HRA, TA, DA. (5)
- (b) Differentiate between class diagram and object diagram in detail. (5)
- Q9 Discuss Testing process, Testing activities and Techniques. (10)

FIFTH SEMESTER [B.TECH./M.TECH.] DECEMBER 2014- January 2015

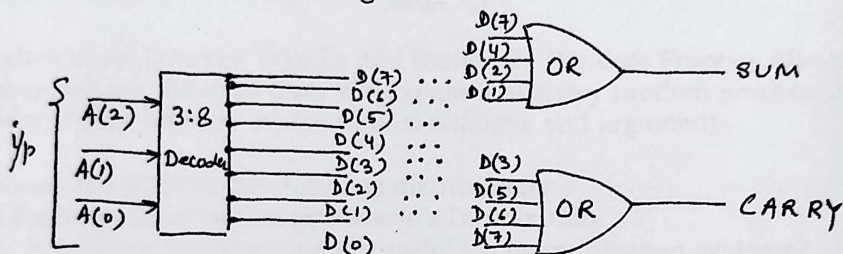
Subject: Digital Design Using VHDL

Maximum Marks :60

**Note: Attempt any five questions including Q.no.1 which is compulsory.
Select one question from each unit.**

- Q1 (a) Briefly outline the purpose of following VHDL modeling constructs:-
 (i) Entity Declaration (ii) Process statement
 (b) Write variable declaration for a counter, initialized to 0; a status flag used to indicate whether a module is busy and a standard-logic value used to store a temporary results.
 (c).Write a Wait Statement that suspends a process until a signal "ready" changes to '1' or until a maximum of 5ms has elapsed.
 (d) Define state machine. (5x4=20)

O2 (a) Write a VHDL code for following circuit:- (5)



- (b) Write an entity declaration and a behavioural architecture body for a two-input multiplexer with input parts 'a', 'b' and 'set' and an output port 'z'. If the set input is '0' the value of 'a' should be copied to 'z', otherwise the value of 'b' should be copied to 'z'. Write a VHDL code to implement the circuit. (5)

OR

- Q3 (a) Explain Generic and blocks construct. (5)
(b) Design an 8:1 MUX using with-select statement. (5)

Q4 (a) Write an 'if' statement that sets a variable 'odd' to '1' if an integer 'n' is odd, or to '0' if it is even. (5)

(b) Write a loop statement that samples a bit input 'd' when a clock input 'clk' changes to '1'. So long as 'd' is 'zero', the loop continues executing. When 'd' is '1' the loop exits. (5)

OR

- Q5 (a) Differentiate between signal and variable. (5)
(b) Design a binary asynchronous counter. (5)

O6 Design and explain' serial Adder suing FSM. (10)

OR

- Q7 Explain RTL. (10)

Q8 Design and explain Shift-And-Add Multiplier. **(10)**

OR

- Q9 Explain Delta, Inertial and transport delay with example. (10)

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