

CBCS SCHEME

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15EC52

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020 Digital Signal Processing

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Derive the expression for DFT and IDFT by using frequency domain sampling of DTFT. (08 Marks)
b. Find IDFT of $X(k) = \{4, -j2, 0, j2\}$. (04 Marks)
c. Determine the circular convolution of the sequences
 $x_1(n) = \{2, 4, 6, 3\}$ $x_2(n) = \{1, 3, 2, 1\}$. (04 Marks)

OR

- 2 a. Find the 8-point DFT of the sequence $x(n) = \{1, 1, 1, 1, 1, 1\}$ by matrix method. (08 Marks)
b. Show that the multiplication of two DFT's leads to circular convolution of respective time sequences. (08 Marks)

Module-2

- 3 a. An FIR filter has the impulse response $h(n) = \{1, 2, 3\}$, determine the response of the filter for input sequence $x(n) = \{1, 2\}$. Use DFT and IDFT technique. (08 Marks)
b. In the direct computation of N-point DFT of $x(n)$, how many
i) Complex multiplications
ii) Complex additions
iii) Real multiplications
iv) Real additions
v) Trigonometric functions, evaluations are required. (08 Marks)

OR

- 4 a. Find the output $y(n)$ of a filter whose impulse response $h(n) = \{3, 2, 1, 1\}$ and input $x(n) = \{1, 2, 3, 3, 2, 1, -1, -2, -3, 5, 6, -1, 2, 0, 2, 1\}$. Using overlap add method assuming the 7 point circular convolution. (10 Marks)
b. The 4 point DFT of a real sequence $x(n)$ is $X(k) = \{1, j, 1, -j\}$. Find the DFT's of the following sequence:
i) $x_1(n) = (-1)^n x(n)$
ii) $x_2(n) = x((n+1))_4$
iii) $x_3(n) = x((4-n))_4$ (06 Marks)

Module-3

- 5 a. Derive 8-point DIT-FFT radix-2 algorithm and draw signal flow graph. (08 Marks)
b. Find IDFT of $x(k) = \{36, -4 + j9.7, -4 + j4, -4 + j1.7, -4, -4 - j1.7, -4 - j4, -4 - j9.7\}$. Using DIF FFT radix -2 algorithm. Use butterfly diagram. (08 Marks)

OR

- 6 a. Derive Goertzel algorithm to compute N-point DFT of an N-point sequence. Provide the direct form – II structure of this algorithm. (08 Marks)
- b. For sequence $x(n) = (2, 0, 2, 0)$ determine $x(2)$ using Goertzel algorithm. Assume initial conditions are zero. (04 Marks)
- c. What is chirp signal? Mention the applications of chirp Z transform. (04 Marks)

Module-4

- 7 a. Design a Butterworth analog high pass filter to meet the following specifications: Maximum passband attenuation = 2dB, minimum stop band attenuation = 20dB, passband edge frequency = 200rad/sec, stop band edge frequency = 100 rad/sec. (12 Marks)
- b. Obtain the direct form – I and direct form – II realization for the following system: $y(n) = 0.75y(n-1) - 0.125y(n-2) + 6x(n) + 7x(n-1) + x(n-2)$ (04 Marks)

OR

- 8 a. Design a butterworth low pass filter using the bilinear transformation for the following specification:
 $0.8 \leq |H(e^{j\omega})| \leq 1$ for $0 \leq \omega \leq 0.2\pi$
 $|H(e^{j\omega})| \leq 0$ for $0.6\pi \leq \omega \leq \pi$
 Assume $T = 2$ (10 Marks)
- b. Obtain the parallel realization of the system function

$$H(z) = \frac{1 + \frac{1}{3}z^{-1}}{1 - \frac{3}{4}z^{-1} + \frac{1}{8}z^{-2}}$$

(06 Marks)

Module-5

- 9 a. Determine the transfer function $H(z)$ of an FIR filter to implement $h(n) = \delta(n) + 2\delta(n-1) + \delta(n-2)$, Using frequency sampling technique. (08 Marks)
- b. Develop the lattice structure for the difference equation

$$y(n) = x(n) + \frac{2}{5}x(n-1) + \frac{3}{4}x(n-2) + \frac{1}{3}x(n-3)$$

(08 Marks)

OR

- 10 a. Realize FIR linear phase filter for N, even. (08 Marks)
- b. Design FIR low pass filter for the frequency response

$$H_d(e^{j\omega}) = \begin{cases} e^{-j2\omega} & -\pi/4 \leq \omega \leq \pi/4 \\ 0 & \pi/4 \leq |\omega| \leq \pi \end{cases}$$

Use Hamming window to determine filter coefficient and frequency response. Take $M = 5$. (08 Marks)

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15EC53

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020

Verilog HDL

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the advantages of HDL's over schematic-based design. (06 Marks)
b. Explain top-down design methodology and bottom-up design methodology. (10 Marks)

OR

- 2 a. Discuss the trends in HDLs. (06 Marks)
b. Explain the design hierarchy using 4-bit ripple carry counter. (10 Marks)

Module-2

- 3 a. Explain the following data types with an example in verilog:
i) Vectors ii) Registers iii) Time iv) Real. (08 Marks)
b. What are system tasks and compiler directives? Explain. (08 Marks)

OR

- 4 a. What are the components of SR-latch? Write verilog HDL module of SR-latch. (08 Marks)
b. With an example, explain Hierarchical names. (08 Marks)

Module-3

- 5 a. With the help of logic diagram, write a verilog code for 4 to 1 multiplexer using gate – level modeling. (08 Marks)
b. What are rise, fall and turn-off delays? Explain, how they are specified in verilog. (08 Marks)

OR

- 6 a. Explain conditional and concatenation operator with an example. (06 Marks)
b. Write a verilog dataflow description for 4-bit full adder with carry lookahead. (10 Marks)

Module-4

- 7 a. Explain briefly event based timing control in verilog. (08 Marks)
b. Explain sequential and parallel blocks of verilog HDL. (08 Marks)

OR

- 8 a. Write a verilog HDL code for JK flip-flop using case statement. (08 Marks)
b. With syntax, explain conditional and branching loop statements in verilog HDL. (08 Marks)

Module-5

- 9 a. Explain the advantages and benefits of VHDL. (06 Marks)
b. Write a VHDL code for full-adder using two half adder in mixed style description. (10 Marks)

OR

- 10 a. Explain the synthesis process with a block diagram. (10 Marks)
b. Differentiate between signal assignment and variable assignment. (06 Marks)

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15EC54

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020 Information Theory and Coding

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- Define entropy and list the properties of entropy. (04 Marks)
 - Consider a zero memory source emitting three symbols s_1 , s_2 and s_3 with respective probabilities 0.5, 0.3 and 0.2. Calculate: i) Entropy of the source ii) All symbols and the corresponding probabilities of the second order extension. Also, find entropy of extended source iii) Show that $H(s^2) = 2H(s)$. (08 Marks)
 - Show that 1 Nat = 1.443 bits. (04 Marks)

OR

- Define Markoff source. Explain with typical transition state diagram. (06 Marks)
 - For the Markoff source shown in Fig.Q.2(b), find
 - State probabilities
 - State entropies
 - Source entropy.

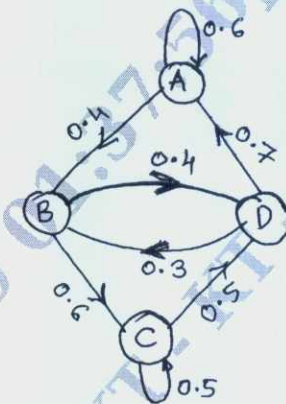


Fig.Q.2(b)

(10 Marks)

Module-2

- State and prove source coding theorem. (08 Marks)
 - Consider a discrete memoryless source with three symbols $S = (X, Y, Z)$ with $P = (0.5, 0.35, 0.15)$
 - Use Shannon's first encoding technique and find the codewords for the symbols. Also, find the source efficiency and redundancy.
 - Consider the second order extension of the source. Recompute the codewords, efficiency and redundancy. (08 Marks)

Module-5

- 9 a. Briefly explain: i) Golay codes ii) BCH codes. (06 Marks)
- b. Consider the convolution encoder shown in Fig.Q.9(b).
- Write the impulse response of the encoder.
 - Find the output for the message (10011) using time-domain approach.
 - Find the output for the message (10011) using transform domain approach.

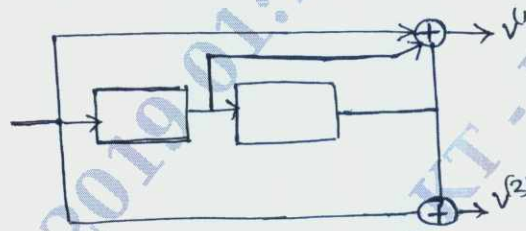


Fig.Q.9(b)

(10 Marks)

OR

- 10 a. Explain various ways to represent convolution codes. (06 Marks)
- b. For the convolution encoder $g^{(1)} = 110$, $g^{(2)} = 101$, $g^{(3)} = 111$
- Draw the encoder block diagram for (3, 1, 2) convolution code
 - Find generator matrix
 - Find codewords corresponding to information sequence 11101 using time domain and transform domain approach. (10 Marks)

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15EC553

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020 Operating System

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing full question from each module.

Module-1

- 1 a. Define operating system. Explain goals and operation of an operating system. (10 Marks)
b. Explain different computational structures in an operating system. (06 Marks)

OR

- 2 a. Briefly explain the different classes of operating system, specifying the primary concern and key concepts used. (10 Marks)
b. In MPOS I/O bound programs should given higher priority than CPU bound programs justify with timing diagram. (06 Marks)

Module-2

- 3 a. Define process control block, explain its content. (08 Marks)
b. What is a thread? Compare kernel and user level thread. (08 Marks)

OR

- 4 a. Compare non preemptive and preemptive scheduling. (08 Marks)
b. With neat block diagram explain scheduling in a time sharing system. (08 Marks)

Module-3

- 5 a. Describe fixed and variable partitioned contiguous memory allocation schemes along with their merits and demerits. (08 Marks)
b. Explain the non contiguous allocation method. (08 Marks)

OR

- 6 a. Explain the data structure in Virtual Memory (VM) handler. (08 Marks)
b. For the following page reference string calculate the number of page faults with FIFO when
i) Number of page frames are three
ii) Number of page frames are four
Page reference string : 5 4 3 2 1 4 3 5 4 3 2 1 5. (08 Marks)

Module-4

- 7 a. With a neat diagram, explain the facilities provided by file system and IOCS layers. (08 Marks)
b. Explain the different operations performed on files. (08 Marks)

OR

- 8 a. Discuss methods of allocation of disk space with block representation. (08 Marks)
b. Explain implementation of file access to open a file. (08 Marks)

Module-5

- 9 a. Explain implementation of message passing in detail. (08 Marks)
b. Explain the interposes communication in UNIX by pipe, message queue and socket technique. (08 Marks)

OR

- 10 a. What is dead lock? Explain dead locks in resource allocation. (08 Marks)
b. Explain dead lock detection algorithm. (08 Marks)

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15EC562

Fifth Semester B.E. Degree Examination, June/July 2019 Object Oriented Programming Using C++

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is C++? How is it different from C? (06 Marks)
b. List and explain the various data types in C++? (06 Marks)
c. Write a note on : i) Enumerated Data Type ii) Const and Volatile. (04 Marks)

OR

- 2 a. Discuss the types of operators supported in C++. (06 Marks)
b. Illustrate the difference between pointers and reference variables in C++. (04 Marks)
c. Explain loops in C++? Give example. (06 Marks)

Module-2

- 3 a. Design a function call cal_SI(), that has three parameters, principle, tenure, rate. Provide default argument to rate. Write a C++ program to find the simple interest using the above function. (06 Marks)
b. What are static variables and functions in C++. (04 Marks)
c. What are local classes in C++? Illustrate with an example program. (06 Marks)

OR

- 4 a. Define friend function. Demonstrate with an example program. (06 Marks)
b. With an example, mention the various circumstances in which, the scope resolution operators are used. (06 Marks)
c. Write a C++ program to overload two functions to find area of a circle and square. (04 Marks)

Module-3

- 5 a. What is a constructor? Write the need of constructor in a class. (04 Marks)
b. Can a class have many constructors? Justify. (04 Marks)
c. Create a class called Clock with data members as hour, minute and member functions readtime (), showtime (). Write a C++ program to input two clock objects and add using operator overloading +. (08 Marks)

OR

- 6 a. What is a destructor? Mention the destructor rules. (04 Marks)
b. Demonstrate unary operator and binary operator overloading. (08 Marks)
c. What is nesting of member functions? (04 Marks)

Module-4

- 7 a. Discuss base class and derived class with suitable example. (04 Marks)
b. What is Hybrid Inheritance? Explain the diamond problem of inheritance in C++ with suitable example. (08 Marks)
c. List the rules for virtual function in C++. (04 Marks)

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OR

- 8 a. Give the significance of 'this' pointer with a program. (06 Marks)
b. What is an abstract class? Write the advantages with an example program. (06 Marks)
c. Differentiate virtual and pure virtual functions. (04 Marks)

Module-5

- 9 a. Explain the stream class hierarchy with a neat diagram. (08 Marks)
b. Describe the following unformatted I/O functions. (08 Marks)
i) get() ii) put() iii) getn() d) write().

OR

- 10 a. Write the syntax and example to create user defined manipulators. (05 Marks)
b. Write a C++ program to copy the content of one file to another. (07 Marks)
c. Why it is necessary to detect the EOF? Give example. (04 Marks)

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15EC563

Fifth Semester B.E. Degree Examination, June/July 2019 8051 Microcontroller

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. i) Differentiate between microprocessor and microcontroller. (04 Marks)
ii) What is an Embedded Microcontroller and What is an Embedded System? (02 Marks)
b. Sketch the neat diagram of 8051 PIN-OUT and explain its pins:
ALE, RST, PSEN, HA, RD, WR, TXD and RXD (10 Marks)

OR

- 2 a. Explain the organization of internal RAM memory of 8051. (08 Marks)
b. Show the interfacing connections of external EPROM and RAM to the 8051 Microcontroller and explain how 8051 access them. (08 Marks)

Module-2

- 3 a. Explain the four data addressing modes of an 8051 microcontroller with an example for each. (06 Marks)
b. Explain the following instructions:
i) XCHD A, @R₀
ii) SWAP A
iii) MOVC A, @A+DPTR
iv) CJNE A, #10H LOOP
v) DA A (10 Marks)

OR

- 4 a. Explain Jump Instructions of 8051 with their ranges of Jump. (06 Marks)
b. Write an ALP to find the value of an expression $S = [(M/N) + 30H]$ values of M and N are stored in the internal memory locations 22H and 23H respectively. Store the result in 24H. (06 Marks)
c. Explain the Logical OR instruction with all possible addressing modes. (04 Marks)

Module-3

- 5 a. Write an ALP to find the Largest number in an array of 10 bytes, stored in the internal memory block starting with 20 H. Store the result at 60 H. (08 Marks)
b. Write an ALP to find sum of ten 8-bit numbers, stored in the internal memory block starting with 30H. Store the 16 bit sum at locations 40H and 41H. (08 Marks)

OR

- 6 a. Explain the operation of PUSH and POP and LCALL, ACALL and RET instructions of 8051 giving all the steps involved. (08 Marks)
b. Write an ALP to transfer 10 bytes of data from location starting with 8030H to location starting with 8041H without overlap. (08 Marks)

Module-4

- 7 a. Explain TMOD register format of 8051. (04 Marks)
 b. Explain MODE-1 programming of Timers of 8051. (04 Marks)
 c. Write an ALP to generate square wave a frequency of 100 kHz on Pin P1.1. Assume crystal frequency, XTAL = 12 MHz. Use Timer1 in Mode 1. (08 Marks)

OR

- 8 a. Explain the principle of operation of serial port of 8051 to transmit and receive a character serially. (06 Marks)
 b. Explain the following RS232 Handshaking signals: RTS and DTR. (02 Marks)
 c. Write an 8051 C program to transfer the message 'GOD' serially at 9600 baud rate with XTAL = 11.0592 MHz. (08 Marks)

Module-5

- 9 a. Interface 8051 to a stepper motor and write an ALP to rotate it 64° in clockwise direction. Step Angle = 2°. (08 Marks)
 b. Explain the different interrupts of 8051 (both external and internal). How to enable mask them? (08 Marks)

OR

- 10 a. Write a 'C' program using interrupts to do following:
 i) Receive data serially and send it to P₀.
 ii) Read Port P1, transmit data serially and give a copy to P₂.
 iii) Make timer 0, to generate a square wave of 5 kHz frequency on P_{0.1}. Assume XTAL = 11.0592 MHz with baud rate at 4800. (08 Marks)
 b. Write a C program to send 'M', 'D', 'E' to the LCD using delays. (08 Marks)

CBCS SCHEME

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15ES51

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020 Management and Entrepreneurship Development

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define the term management and its functions. (06 Marks)
b. List and explain the roles of a manager. (05 Marks)
c. In brief explain whether management is a science or an art. (05 Marks)

OR

- 2 a. What is planning? List out its importance. (05 Marks)
b. Explain the types of planning. (06 Marks)
c. List and explain the steps employed in decision making. (05 Marks)

Module-2

- 3 a. Define the meaning of an organization and steps in process of organizing. (05 Marks)
b. What is staffing? Explain its importance. (05 Marks)
c. List and explain the techniques in the selection process. (06 Marks)

OR

- 4 a. What is motivation? Explain Maslow's need hierarchy theory. (05 Marks)
b. Define the word coordination and its types. (05 Marks)
c. Explain the term leadership and its types. (06 Marks)

Module-3

- 5 a. Explain the meaning of social responsibilities of business towards various groups. (06 Marks)
b. Define the business ethics and corporate governance. (05 Marks)
c. What is social audit? Explain its importance. (05 Marks)

OR

- 6 a. Define the meaning of an Entrepreneur and their characteristics. (06 Marks)
b. List and explain types of Entrepreneurs. (05 Marks)
c. Explain the Entrepreneurial development cycle. (05 Marks)

Module-4

- 7 a. What are SSI's and the impact of globalization and WTO on SSI's? (08 Marks)
b. Define Ancillary industry and tiny industries. (08 Marks)

OR

- 8 a. List and explain two institutional support of central level institutions. (08 Marks)
b. Explain the services provided by Small Industries Development Organization (SIDO). (08 Marks)

Module-5

- 9 a. Define product planning and development strategy. (08 Marks)
b. Explain the ways of project identification. (08 Marks)

OR

- 10 a. Write a note on network analysis. (05 Marks)
b. Explain PERT and CPM. (06 Marks)
c. Define importance for network techniques. (05 Marks)

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