

CBCS SCHEME

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17EC52

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

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Show that finite duration sequence of length L can be reconstructed from the equidistant N samples of its Fourier transform, where $N \geq L$. (06 Marks)
- b. Compute the 6 – point DFT of the sequence $x(n) = \{1, 0, 3, 2, 3, 0\}$. (08 Marks)
- c. Find the N-point DFT of the sequence $x(n) = a^n, 0 \leq n \leq N - 1$. (06 Marks)

OR

- 2 a. Determine the 6-point sequence $x(n)$ having the DFT $X(K) = \{12, -3 - j\sqrt{3}, 0, 0, 0, -3 + j\sqrt{3}\}$. (08 Marks)
- b. Derive the equation to express z – transform of a finite duration sequence in terms of its N-point DFT. (06 Marks)
- c. Compute the circular convolution of the sequences $x_1(n) = \{1, 2, 2, 1\}$ and $x_2(n) = \{-1, -2, -2, -1\}$. (06 Marks)

Module-2

- 3 a. State and prove the modulation property (multiplication in time-domain) of DFT. (06 Marks)
- b. The even samples of an eleven-point DFT of a real sequence are : $X(0) = 8, X(2) = -2 + j3, X(4) = 3 - j5, X(6) = 4 + j7, X(8) = -5 - j9$ and $X(10) = \sqrt{3} - j2$. Determine the odd samples of the DFT. (06 Marks)
- c. An LTI system has impulse response $h(n) = \{2, 1, -1\}$. Determine the output of the system for the input $x(n) = \{1, 2, 3, 3, 2, 1\}$ using circular convolution method. (08 Marks)

OR

- 4 a. State and prove circular time reversal property of DFT. (06 Marks)
- b. Determine the number of real multiplications, real additions, and trigonometric functions required to compute the 8-point DFT using direct method. (04 Marks)
- c. Find the output $y(n)$ of a filter whose impulse response is $h(n) = \{1, 2, 1\}$, and the input is $x(n) = \{3, -1, 0, 1, 3, 2, 0, 1, 2, 1\}$ using overlap – add method, taking $N = 6$. (10 Marks)

Module-3

- 5 a. Compute the 8-pont DFT of the sequence $x(n) = \cos(\pi n/4), 0 \leq n \leq 7$, using DIT–FFT algorithm. (10 Marks)
- b. Given $x(n) = \{1, 2, 3, 4\}$, compute the DFT sample $X(3)$ using Goestzel algorithm. (06 Marks)
- c. Determine the number of complex multiplications and complex additions required to compute 64-point DFT using radix.2 FFT algorithm. (04 Marks)

OR

- 6 a. Determine the sequence $x(n]$ corresponding to the 8-point DFT $X(K) = \{4, 1-j2.414, 0, 1-j0.414, 0, 1+j0.414, 0, 1+j2.414\}$ using DIF-FFT algorithm. (10 Marks)
- b. Draw the signal flow graph to compute the 16-point DFT using DIT-FFT algorithm. (04 Marks)
- c. Write a short note on Chirp-z transform. (06 Marks)

Module-4

- 7 a. Draw the direct form I and direct form II structures for the system given by :

$$H(z) = \frac{z^{-1} - 3z^{-2}}{1 + 4z^{-1} + 2z^{-2} - 0.5z^{-3}}$$
 (08 Marks)
- b. Design a digital Butterworth filter using impulse-invariance method to meet the following specifications :
 $0.8 \leq |H(\omega)| \leq 1, \quad 0 \leq \omega \leq 0.2\pi$
 $|H(\omega)| \leq 0.2, \quad 0.6\pi \leq \omega \leq \pi$
 Assume $T = 1$. (12 Marks)

OR

- 8 a. Draw the cascade structure for the system given by :

$$H(z) = \frac{(z-1)(z-3)(z^2+5z+6)}{(z^2+6z+5)(z^2-6z+8)}$$
 (08 Marks)
- b. Design a type-1 Chebyshev analog filter to meet the following specifications :
 $-1 \leq |H(\Omega)| \leq 0, \quad 0 \leq \Omega \leq 1404\pi \text{ rad/sec}$
 $|H(\Omega)| \leq -60, \quad \Omega \geq 8268\pi \text{ rad/sec}$ (12 Marks)

Module-5

- 9 a. Realize the linear phase digital filter given by :

$$H(z) = 1 + \frac{1}{2}z^{-1} + \frac{1}{3}z^{-2} + \frac{2}{5}z^{-3} + \frac{1}{3}z^{-4} + \frac{1}{2}z^{-5} + z^{-6}$$
 (06 Marks)
- b. List the advantages and disadvantages of FIR filter compared with IIR filter. (04 Marks)
- c. Determine the values of $h(n)$ of a detail low pass filter having cutoff frequency $\omega_c = \pi/2$ and length $M = 11$. Use rectangular window. (10 Marks)

OR

- 10 a. An FIR filter is given by : $y(n) = x(n) + \frac{2}{5}x(n-1) + \frac{3}{4}x(n-2) + \frac{1}{3}x(n-3)$. Draw the Lattice structure. (06 Marks)
- b. Determine the values of filter coefficients $h(n)$ of a high-pass filter having frequency response :

$$H_d(e^{j\omega}) = 1, \quad \frac{\pi}{4} \leq |\omega| \leq \pi$$

$$= 0, \quad |\omega| \leq \frac{\pi}{4}$$
 Choose $M = 11$ and use Hanning windows. (10 Marks)
- c. Write the time domain equations, widths of main lobe and maximum stop band attenuation of Bartlett window and Hanning window. (04 Marks)

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17EC53

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

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Explain typical design flow for designing VLSI IC circuit using the flow chart. (08 Marks)
b. Write the verilog code for 4-bit ripple carry counter. (07 Marks)
c. What are the advantages of HDLs compared to traditional schematic based design? (05 Marks)

OR

- 2 a. Explain top-down design methodology with example. (08 Marks)
b. What are the two styles of stimulus application? Explain each method in brief. (07 Marks)
c. Mention the features of verilog HDL. (05 Marks)

Module-2

- 3 a. Explain the following verilog data types with an examples, (10 Marks)
(i) Nets
(ii) Registers
(iii) Integers
(iv) Parameters
(v) Arrays
b. Write the verilog description of SR-latch. Also write stimulus code. (06 Marks)
c. How to write comments in verilog HDL, explain with examples. (04 Marks)

OR

- 4 a. With neat block diagram, explain the components of verilog module. (08 Marks)
b. Explain \$display, \$monitor, \$finish and \$stop system tasks with examples. (08 Marks)
c. Declare the following variables in verilog: (04 Marks)
(i) An 8-bit vector net called a_in.
(ii) An integer called count.
(iii) A memory MEM containing 256 words of 64 bits each.
(iv) A parameter cache_size equal to 512.

Module-3

- 5 a. Write a verilog data flow description for 4-bit full adder with carry lookahead logic. (08 Marks)
b. What are rise, fall and turn-off delays? How they are specified in verilog? (06 Marks)
c. What would be the output of the following $a = 4'b0111$, $b = 4'b1001$
(i) $\&b$ (ii) $a \ll 2$ (iii) $\{a, b\}$ (iv) $\{2\{b\}\}$ (v) $a \wedge b$
(vi) $a | b$ (06 Marks)

OR

- 6 a. Write the verilog code for 4-to-1 multiplexer using,
(i) Conditional operator (ii) Logic equation. (06 Marks)
- b. Discuss And, Or and Not gates with respect to logic symbols, gate instantiation and truth tables. (08 Marks)
- c. Explain assignment delay, implicit assignment delay and net declaration delay for continuous assignment statements. (06 Marks)

Module-4

- 7 a. Explain the blocking assignment statements and non blocking assignment statements with relevant examples. (08 Marks)
- b. Write a verilog behavioural description of 8 : 1 multiplexer using case statement. (06 Marks)
- c. Explain Event based timing control with example. (06 Marks)

OR

- 8 a. Discuss sequential and parallel blocks with examples. (08 Marks)
- b. Write the verilog behavioural description of 4-bit binary counter. (06 Marks)
- c. Illustrate the use of while loop and repeat loop with suitable examples. (06 Marks)

Module-5

- 9 a. Explain synthesis process with neat block diagram. (08 Marks)
- b. Write the structural description of 4-bit equality comparator. (06 Marks)
- c. Explain the following with general syntax and examples (i) Entity (ii) Architecture. (06 Marks)

OR

- 10 a. Discuss the capabilities of VHDL. (06 Marks)
- b. Write the VHDL code for two 4-bit comparator using data flow description and when-else statement. (08 Marks)
- c. Explain the declaration of constants, variables and signals in VHDL with examples. (06 Marks)

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17EC553

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

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Define operating system. Explain the key concern and of an operating system. (07 Marks)
b. Explain the various resource allocation and resource sharing strategies. (08 Marks)
c. What are the common tasks performed by an operating system? (05 Marks)

OR

- 2 a. Explain briefly, the different classes of operating system with primary concern and key concepts. (10 Marks)
b. With a neat diagram explain the turnaround time in batch processing system. (06 Marks)
c. Discuss various computations in an operating system. (04 Marks)

Module-2

- 3 a. Define process, process states and with a state transition diagram explain the state transition for a process. (10 Marks)
b. Discuss the different fields of the process control block (PCB). (06 Marks)
c. What are the differences between threads and processes? (04 Marks)

OR

- 4 a. For a given set of processes perform FCFS and SRN scheduling and compare their performance in terms of mean turnaround time and weighted turn around. (10 Marks)

Process	P ₁	P ₂	P ₃	P ₄	P ₅
Arrival time	0	2	3	5	9
Service time	3	3	2	5	3

- b. With a neat sketch, explain long, medium and short term schedulers. (06 Marks)
c. Compare non-preemptive and preemptive scheduling concepts. (04 Marks)

Module-3

- 5 a. Define the following terms with necessary sketches :
i) Internal and external fragmentation
ii) Paging and segmentation
iii) Logical address and physical address.
iv) Page and page frame. (12 Marks)
b. With a neat diagram explain the working of address translation in non-contiguous memory allocation. (08 Marks)

OR

- 6 a. With a neat sketch, explain demand paging preliminaries. (12 Marks)
b. Consider the page reference string 0, 1, 2, 1, 3, 0, 4, 1, 2, 1, 3, 7, 4, 5, 7. Calculate the page faults. Using FIFO and LRU page replacement policies with a frame size 3. (08 Marks)

Module-4

- 7 a. Explain file system and IOCS with necessary sketches. (08 Marks)
 b. Explain any three allocation methods of disk space for files and mention advantages and disadvantages of each. (12 Marks)

OR

- 8 a. What is a directory? Discuss typical directory entry fields and explain different directory structures. (12 Marks)
 b. Discuss the working of file system action at file close. (08 Marks)

Module-5

- 9 a. Write a note on :
 i) Issues in message passing (12 Marks)
 ii) Direct and indirect naming in message passing
 iii) Blocking and non-blocking sends in message passing. (08 Marks)
 b. Explain mailboxes, give the advantages of mail boxes. (08 Marks)

OR

- 10 a. With necessary sketches, explain the different deadlock prevention approaches. (10 Marks)
 b. Using deadlock detection algorithm for the following example of system check, whether the deadlock exist in the system or not. (10 Marks)

	R ₁	R ₂	R ₃
P ₁	2	1	0
P ₂	1	3	1
P ₃	1	1	1
P ₄	1	2	2

Allocated Resources

	R ₁	R ₂	R ₃
P ₁	2	1	3
P ₂	1	4	0
P ₃	0	0	0
P ₄	1	0	2

Requested Resources

R ₁	R ₂	R ₃
0	0	1

Free Resources

R ₁	R ₂	R ₃
5	7	5

Total resources

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17EC/TE/EI/BM/ML/ES51

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

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Define Management. Differentiate between Administration and Management. (10 Marks)
b. Briefly explain, whether Management in a Science or Art. (10 Marks)

OR

- 2 a. Explain the importance of Planning. (10 Marks)
b. Explain the hierarchy of Plans. (10 Marks)

Module-2

- 3 a. Briefly explain the principles of Organisation. (10 Marks)
b. Briefly explain the techniques of selection. (10 Marks)

OR

- 4 a. Briefly explain the Maslow's hierarchy of needs. (10 Marks)
b. Differentiate between Autocratic, Participative and Free – Rein leadership style. (10 Marks)

Module-3

- 5 a. What is the meaning of social responsibility of business? Explain social responsibility of business towards different group. (10 Marks)
b. Define the term "Entrepreneur". Explain the functions of an Entrepreneur. (10 Marks)

OR

- 6 a. Explain the various barriers of Entrepreneurship. (10 Marks)
b. Explain development cycle of Entrepreneur. (10 Marks)

Module-4

- 7 a. Define "Small Scale Industry" and state the characteristics of a SSI. (10 Marks)
b. Explain the functions of WTO. (10 Marks)

OR

- 8 a. Explain the objectives of KSFC. (10 Marks)
b. Explain the objectives of TECSOK. (10 Marks)

Module-5

- 9 a. Define Project. State and explain the classification of Projects. (10 Marks)
b. Explain the criteria's for selecting a Project. (10 Marks)

OR

- 10 a. Explain importance of Network Analysis. (10 Marks)
b. Explain briefly advantages and disadvantages of PERT and CPM. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.