EXTC / Paper / Subject Code: 37002 / DISTRICT TIME SIGNAL PROCESSING / NOV. 2019
Sem - VI - CBSGS

(3 Hours) [Total Marks: 80]

N.B.: (1) **Questions No.1** is **compulsory**.
(2) Attempt **any three** questions out of remaining **five** questions.
(3) Assume suitable **data** if **required**.
(4) **Figures** to the **right** indicate **full marks**.

Q 1.Solve **any four** 20

a) What method would you adopt to filter long data sequence? Explain any one method.

b) Given an analog filter, you are directed to design a digital IIR filter with the same specifications, list the steps you would follow. How would you go about the task and what desirable properties of the conversion techniques would you cite?

c) List the application of multirate signal processing. Explain the importance of multirate digital signal processing.

d) How does the position (within or outside of unit circle) of the zeros effect the phase of the system?

e) Retrieve the original sequence $x(n)$ from $X(k)$=[2, 1-j, 0, 1+j] using IDIF-FFT only.

Q2 a) Determine the N-point DFT, using DIT-FFT only, of the signal 10

$$x(n) = 6cos^2\left(\frac{n\pi}{4}\right) for\ 0 \le n \le 7$$

b) Design a High pass filter that is monotonic in pass-band with cut-off frequency of 1000 Hz and down 10 dB at 350 Hz, using Bilinear Transform, with $f_s$=5000 Hz. 10

Q3 a) Compute the DFT of 2- 4 point sequences p(n)= [2 1 5 4] and q(n)=[4 6 3 2] using 4 point DFT only once. 10

b) Explain with suitable examples how zeros are positioned under different symmetry conditions of a linear phase FIR filter. 10

Q4 a) Design a Chebyshev filter for the given specifications using impulse invariance technique 10

$$0.8 \le |H(e^{jw})| \le 1 \quad 0 \le \omega \le 0.2\pi$$
$$|H(e^{jw})| \le 0.2 \quad 0.6\pi \le \omega \le \pi$$

b) Design a high pass filter with frequency response using Hanning window of N=11. 10

$$H_d(e^{jw}) = 1\ for\ \frac{-\pi}{4} \le \omega \le \pi$$
$$= 0\ for \quad |\omega| \le \frac{\pi}{4}$$

Q5 a) Find DFT of a 4-point sequence $x(n)$=[1, 2, 3, 4], then using properties of DFT find the DFT of $x_1(n)$=[1, 0, 2, 0, 3, 0, 4, 0] and $x_2(n)$= [1, 2, 3, 4, 1, 2, 3, 4]. 10

b) Explain the Finite length effects in Digital Filters. 10

Q6 a) Explain DTMF application of digital signal processing. 10

b) Explain sub-band coding of speech signal with neat illustration. 10

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I - EXTC / Paper / Subject Code: 37005 / OPERATING SYSTEMS / Dec 2019

(3 Hours) [Total Marks: 80]

N.B.: (1) Question No.1 is **compulsory.**
(2) Solve any **three** from remaining **five** questions.
(3) Assume Suitable Data if required.

Q1 Attempt any **Four.** 20
(a) What is a system call? Di:;cuss various system calls in short 05
(b) What is PCB? Explain various fields of PCB. 05
(c) Compare Paging and Segmentation scheme used in Memory management. 05
(d) What is a Kernal? Compare Micro and Monolithic Kernel. 05
(e) What are the different features ofRTOS? 05
(t) Compare and Contrast: thread and process. 05

Q2 (a) What is process? Explain the life cycle of a process using process state transition diagram. 10
(b) What is critical section problem? What is the solution to the critical section. 10

Q3 (a) schedulers 10
(b) What is a directory system? What are the different types of directory structure? 10

Q4 (a) Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order is
86,1470,913,1774,948,1509,1022,1750,130
Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following dis-scheduling algorithms?
a. FCFS
b. SSTF
c. SCAN
d. LOOK
e. C-SCAN (change data)
(b) Explain working of EDF and RMA real time scheduling algorithms. Differentiate between Deadlock A voidance and Deadlock prevention. 10

Q5 Write a note on **(any 2)** 20
a) Cyclic Schedulers
b) I-Node structure
c) File Allocation methods
d) Demand Paging

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