III B.Tech. II Semester Supplementary Examinations May 2019
Digital Signal Processing
(Electronics and Communication Engineering)

Max. Marks: 70 　　　　　　　　　　　　　　　　　　　　 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Examine the following systems for linearity, time-invariance and stability
   - (i)　　y(n) + y(n-1) = x(n) + x(n-2)
   - (ii)　　$y(n) = a^{\{x(n)\}}$ 　　　　　　　　　　　　　　　　　　　　　7M

   b) A discrete time system is represented by the following equation

   y(n) = (3/2) y(n-1) − (½) y(n-2) + x(n) with initial conditions y(-1) = 0, y(-2) = - 2 and x(n) = $(1/4)^n$ u(n).

   Determine the total response of the system. 　　　　　　　　　　7M

OR

2. a) State and prove the following DFS properties
   - (i)　　Linearity　　　(ii) Time shifting
   - (iii)　　Symmetry　 (iv) Periodic Convolution 　　　　　　　　8M

   b) If the DFT{x(n)} = X(k)={4, -j2, 0, j2}, using properties of DFT, find DFT of x(n - 2). 　　6M

UNIT–II

3. a) Compare DIT and DIF algorithms. 　　　　　　　　　　　　　　4M

   b) Develop the necessary three stage computation equations for radix-2 DIT FFT method. 　　10M

OR

4. a) Find the DFT of the sequence x(n) = {2,1,2,1,2,1,2,1,} using radix-2 DIF-FFT algorithm.

   　　　　　　　　　　　　　　　　　　　　　　　　　　　　　8M

   b) Find the IDFT of the sequence

   　 X(k) = { 10, -2+j2, -2, -2-j2 } using DIT algorithm. 　　　　6M

UNIT–III

5. a) For the given specifications design an analog Butterworth filter.
   　　0.9　　H(j　)　 1　 for 0　　　　0.2　.
   　　　　　H(j　)　　0.2 for 0.4　　　　　　.　　　　　　　　　7M

   b) Determine the transposed direct form-II for the given system
   　　y(n) = ½ y(n-1) − ¼ y(n-2) + x(n) + x(n-1) 　　　　　　7M

OR

6. a) Explain FIR filter design procedure using windowing method. 　　4M

   b) Design a digital FIR low pass filter using rectangular window by taking 9 samples of w(n) and with a cutoff frequency of 1.2 rad/sec. 　　　　10M

UNIT–IV

7. a) (i)　Describe the Decimation process by a factor D
   　 (ii)　Describe the interpolation process by a factor 　　　　　7M

   b) Discuss about sampling conversion by a rational factor /D. Obtain necessary equations. 　　7M

OR

8. Discuss various filter design methods and implementations for sampling rate conversion. 　14M

UNIT–V

9. What are the applications of DSP? Explain any one application clearly. 　14M

OR

10. a) Explain the process of signal compression and decompression 　　7M

    b) Discuss about oversampling of D/A Converter 　　　　　　　　7M

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III B.Tech. II Semester Supplementary Examinations May 2019
Microprocessors and Interfacing
(Electronics and Communication Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Explain the queue structure of 8086 and its limitations   9M

    b) What is addressing mode? Explain the following addressing modes of 8086 with suitable examples: (i) Register addressing, (ii) Based indexed addressing, (iii) Indirect addressing, (iv) Immediate addressing   5M

OR

2. a) Differentiate between procedure and Macros   6M

    b) Describe the significance of following pins of 8086

        (i) ALE , (ii) $RESET$,(iii) $\overline{TEST}$, (iv) $M/\overline{IO}$ 8M

UNIT–II

3. a) Write a program to interface stepper motor to 8086   5M

    b) Interface ADC 0800 with 8086 using 8255 ports. Use port A of 8255 for transferring digital data output of ADC to the CPU and port C for control signals. Assume that an output is present at I/P2 of the ADC and a clock input of suitable frequency is available for ADC. Draw the schematic and write the required ALP.   9M

OR

4. a) Interface an 8255 with 8086 at 80H as an I/O address of port A. Interface five 7 segment displays with the 8255. Write a sequence of instructions to display 1, 2, 3, 4, and 5 over the five displays continuously as per their positions starting with 1 at the least significant position.   9M

    b) Discuss the transfer modes of 8237   5M

UNIT–III

5. a) Distinguish between programmed I/O and interrupt driven I/O.   5M

    b) What are the sequence of action taken by 8086 and the device, when a device interrupts 8086 over INTR line? Explain about the software and reserved internal interrupts of 8086.   9M

OR

6. a) Explain the modes of operation of 8253 PIT with necessary diagram   7M

    b) Demonstrate the initialization command words of 8259A PIC   7M

UNIT–IV

7. a) Design a hardware interfacing circuit for interfacing 8251 with 8086. Set the 8251A in asynchronous mode as a transmitter and receiver with even parity enabled, 2 stop bits, 8-bit character length, frequency 160 kHz and baud rate 10 K. Write an ALP to transmit 100 bytes of data string starting at location 2000:5000H   7M

    b) From the above data in Q.7 (a), Write an ALP to receive 100 bytes of data string and store it at 3000:4000 H.   7M

OR

8. a) Draw the architectural block diagram of 8251A and explain the function of each block   9M

    b) What is current loop? Explain how 20 mA current loop is used to provide serial data communication between 8086 and a peripheral.   5M

UNIT–V

9. List the salient features of Pentium and Pentium pro processors   14M

OR

10. Draw and explain architecture of 80286 processor.   14M

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