Reg. No. :

Question Paper Code : 80345

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Fifth Semester

Electronics and Communication Engineering

EC 6504 — MICROPROCESSOR AND MICROCONTROLLER

(Common to Fifth Semester Biomedical Engineering and also common to Fourth Semester Information Technology and Medical Electronics/Computer Science and Engineering)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the flags of 8086 microprocessor.

2. List the segment registers of 8086.

3. Define machine cycle.

4. Define Bus.

5. How DMA is initiated?

6. What is the drawback of memory mapped I/O?

7. Draw the pin diagram of 8051.

8. What is the significance of EA pin?

9. List the modes of Timer in 8051.

10. State how baud rate is calculated for serial data transfer in mode 1.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the internal hardware architecture of 8086 microprocessor with neat diagrams. (12)

(ii) Write a short note about assembler directives. (4)

Or

(b) Explain the various addressing modes of 8086 microprocessor with suitable examples. (16)

12. (a) Discuss about the multiprocessor configurations of 8086. (16)

Or

(b) Explain in detail about the system bus timing of 8086/8088. (16)

13. (a) Explain in detail about DMA controller. (16)

Or

(b) Explain the procedure of interfacing D/A and A/D converter circuit. (16)

14. (a) Explain in detail about the architecture of 8051 microcontroller with a neat diagram. (16)

Or

(b) Write an ALP using 8051 instructions to receive bytes of data serially and put them in P1. Set the baud rate at 4800, 8-bit data, and 1 stop bit. (16)

15. (a) Describe the different modes of operation of timers/counters in 8051 microcontroller. (16)

Or

(b) Draw a diagram to interface a stepper motor with 8051 microcontroller, also write an 8051 ALP to run the stepper motor in both forward and reverse direction with a delay. (16)

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Question Paper Code : 80343

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Fifth Semester

Medical Electronics

EC 6502 — PRINCIPLES OF DIGITAL SIGNAL PROCESSING

(Common to Electronics and Communication Engineering and Sixth Semester Biomedical Engineering)

(Regulations 2013)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Compare Radix 2 DIT, DIF FFT algorithm.

2. Test the causality and stability of $y(n) = \sin x(n)$.

3. What is known as prewarping?

4. What are the properties of bilinear transformation?

5. What do you understand by linear phase response?

6. What are the desirable characteristics of the window?

7. What are the different types of fixed point representation?

8. Name the three quantization error due to finite word length registers in digital filters.

9. What is the need for anti imaging filter after upsampling signal?

10. What is meant by adaptive filter?

PART B — (5 × 16 = 80 marks)

11. (a) Derive radix 2 – DIT FFT algorithm and obtain DFT of the sequence $x(n) = \{1,2,3,4,4,3,2,1\}$ using DIT algorithm. (16)

Or

(b) (i) Compute IDFT of the sequence $X(K) = \{7, -0.707, -j0.707, -j, 0.707 - j0.707, 1, 0.707 + j0.707\, j, -0.707 + j\, 0.707\}$ using DIF algorithm. (10)

(ii) Perform the linear convolution of finite duration sequences $h(n) = \{1,2\}$ and $x(n) = \{1,2,-1,2,3,-2,-3,-1,1,2,-1\}$ by overlap save method. (6)

12. (a) Design a third order Butterworth digital filter using impulse invariant technique. Assume sampling period T = 1 sec. (16)

Or

(b) Convert the single pole low pass filter with system function $H(z) = \frac{0.5(1+z^{-1})}{1-0.302z^{-2}}$ into band pass filter with upper and lower cut off frequencies w_u & w_L respectively. The LPF has 3dB BW of $w_p = \frac{\pi}{6}$ & $w_u = \frac{3\pi}{4}$, $w_l = \frac{\pi}{4}$.

13. (a) Design an ideal BPF with a frequency response $H\alpha(e^{jw}) = 1, \quad for\ \frac{\pi}{4} \le |w| \le \frac{3\pi}{4}$.

$0, \quad$ otherwise

Find the value of $h(n)$ for $N = 11$ and plot the frequency response. (16)

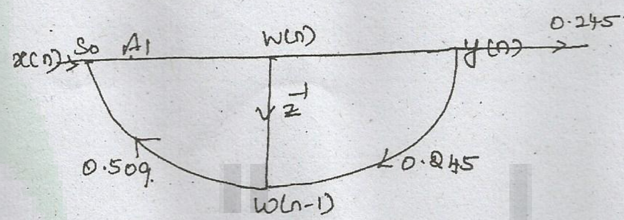
Or

(b) Design a linear phase FIR filter with a cut off frequency of $\frac{\pi}{2}\, r/\text{sec}$. Take $N = 17$ using frequency sampling techniques. (16)

14. (a) Study the limit cycle behaviour of the system described by $y(n) = Q[a\, y(n-1)] + x(n)$, where $y(n)$ is the output of the filter and $Q[.]$ is quantization. Assume $a = \frac{7}{8}$, $x(0) = \frac{3}{4}$ & $x = 0$, for $n > 0$ choose 4 bit sign magnitude. (16)

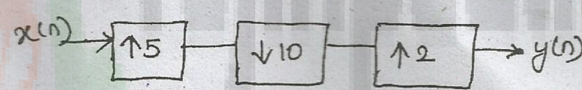
Or

(b) For the digital network shown in figure find $H(z)$ and scale factor. So to avoid over flow register A_1 (16)



15. (a) (i) Explain in about detail the multistage implementation of sampling rate conversion. (8)

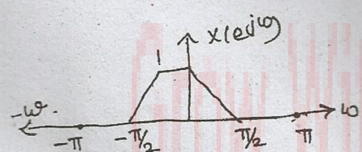
(ii) For the multirate system shown in figure develop an expression for the output $y(n)$ as a function of i/p $x(n)$ (8)



Or

(b) (i) Show that the upsampler and down sampler are time variant systems. (8)

(ii) The frequency response of $x(n)$ is shown in figure



If the input is passed through a down sampler by 2, find the frequency response of output and give your comment on aliasing. (8)

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B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Fifth Semester

Electronics and Communication Engineering

EC 6503 — TRANSMISSION LINES AND WAVE GUIDES

(Regulations 2013)

Time : Three hours   Maximum : 100 marks

(Normalized Smith chart is to be provided)

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by distortionless line?

2. Find the Characteristic impedance of a line at 1600 HZ if $Z_{oc} = 750\angle -30^\circ\,\Omega$ and $Z_{sc} = 600\angle -20^\circ\,\Omega$.

3. Write the expression for the input impedance of open and short circuited dissipationless line.

4. Calculate Standing Wave Ratio and Reflection Coefficient on a line having the characteristic impedance $Z_0 = 300\,\Omega$ and terminating impedance in $Z_R = 300 + j400\,\Omega$.

5. Distinguish between Single Stub and Double Stub matching in a transmission line.

6. Give the application of eight wave line.

7. A constant-K, T-section high pass filter has a cut off frequency of 10 KH and the design impedance is 600 Ω. Determine the value of shunt inductance L and series Capacitance C.

8. Define propagation constant in a symmetrical network.

9. Justify, why TM_{01} and TM_{10} modes in a rectangular waveguide do not exit.

10. An air-filled rectangular waveguide of inner dimensions 2.286 × 1.016 in centimeters operates in the dominant TE_{10} modes. Calculate the cut-off frequency and phase velocity of a wave in the guide at a frequency of 7 GHz.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain in detail about the reflection on a line not terminated by its characteristic impedance Z_0. (8)

(ii) Derive the condition for minimum attenuation in a distortionless line. (8)

Or

(b) A Communication line has L = 3.67 mH/km, G = 0.08 × 10^{-6} mhos/km, C = 0.0083 μF/km and R = 10.4 ohms/km. Determine the characteristic impedance, propagation constant, phase constant, velocity of propagation, sending end current and receiving end current for given frequency f = 1000 HZ, Sending end voltage is 1 volt and transmission line length is 100 kilometers. (16)

12. (a) (i) Derive an expression for the input impedance of a dissipationless line and also find the input impedance is maximum and minimum at a distance 's'. (8)

(ii) Find the sending end line impedance for a HF line having characteristic impedance of 50 Ω. The line is of length (1.185 λ) and is terminated in a load of (110 + j80) Ω. (8)

Or

(b) (i) Describe an experimental set up for the determination of VSWR of an RF transmission. (8)

(ii) Briefly explain on :

(1) Standing Waves

(2) Reflection loss. (4 + 4)

13. (a) (i) Determine length and location of a single short circuited stub to produce an impedance match on a transmission line with characteristic impedance of 600 Ω and terminated in 1800 Ω. (8)

(ii) Explain the operation of quarter wave transformer and mention it's important applications. (8)

Or

(b) (i) Find the sending end impedance of a line with negligible losses when characteristic impedance is 55 Ω and the load impedance is 115 + j75 Ω length of the line is 1.183 wave length by using smith chart. (10)

(ii) Explain the significance of smith chart and its application in a transmission lines. (6)

14. (a) What is m-Derived filter? Draw a m-Derived T-section and π-section low pass filter and explain the analysis of m-Derived low pass filter with respect to attenuation, phase shift and characteristic impedance with frequency profile respectively. (16)

Or

(b) What is composite filter? Design a constant-K-low pass filter (T-section and π-section) and having cut-off at which 2.5 KHz and design resistance R_0 is 700 Ω. Also find the frequency at which this filter produces attenuation of 19.1 dB. Find its characteristic impedances and phase constant at pass band and stop or attenuation band. (2 + 14)

15. (a) Derive an expression for the transmission of TE waves between parallel perfectly conducting planes for the field components. (16)

Or

(b) (i) Write a brief note on circular cavity resonator and its application. (8)

(ii) A TE_{11} wave is propagating through a circular waveguide. The diameter of the guide is 10 cm and the guide is air-filled. Given $X_{11} = 1.842$.

(1) Find the cut-off frequency. (3)

(2) Find the wavelength λ_g in the guide for a frequency of 3 GHz. (2)

(3) Determine the wave impedance in the guide. (3)

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