AR13 SET-2

CODE: 13EC3018

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech I Semester Regular / Supplementary Examinations, November-2016

SIGNALS AND SYSTEMS

(Electrical and Electronics Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 X 10 = 10 M]**

1. a) Define unit step response.
   b) Define transfer function.
   c) Mention the relation between unit step and impulse function.
   d) Mention the necessary conditions for a Fourier transform to exist.
   e) Mention the condition for causality of an LTI system.
   f) What is the use of unilateral Z transform?
   g) Obtain the relation between DTFT and Z transform.
   h) Define singularity function.
   i) Mention the ROC properties of Laplace Transform.
   j) Find the Laplace transformer of $x(t) = e^{-at}\ u(t)$.

PART-B

Answer one question from each unit **[5X12=60M]**

UNIT-I

2. a) Evaluate the convolution integral for a system with input x(t) and impulse response h(t) respectively given by $x(t)=h(t)=A[u(t+\tau)-u(t-\tau)]$. [8M]
   b) Derive the condition for stability for LTI systems. [4M]

(OR)

3. a) Find the ever and odd compone of the following signals (i) $x(t)=u(t)=\begin{cases}1 & t>0\\ 0 & t<0\end{cases}$

   (ii) $x(t) = Ae^{-\alpha} \quad t>0$

   $= 0 \quad t<0$

   b) For an energy signal x(t) with energy E_x, show that (i) the energy of the signal $x_1(t)=-x(t)$, $x_2(t)=x(-t)$, and $x_3(t)=x(t-T)$ is E_x (ii) The energy of $x_1(t)=ax(t)$ is $a^2 E_x$.

UNIT – II

4. a) State and prove the (i) time shifting (ii) time scaling (iii) Differentiation properties of Fourier series. [6M]

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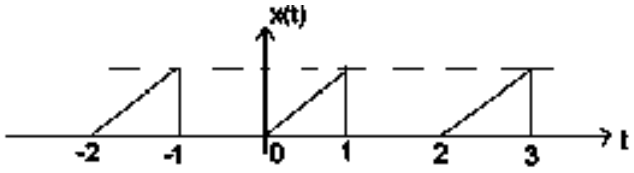
b) Find the trigonometric Fourier series for the waveform shown below and sketch the line spectrum. [6M]



(OR)

5. Prove that for half wave symmetry $x(t) = x\left(t \pm \frac{T}{2}\right)$ the Fourier series coefficients a_0=0; [12M]

$a_n = 0$ for n even

$= \frac{4}{T}\int_0^{T/2} x(t)\cos(n\omega_0 t)\,dt$ for n odd

$b_n = 0$ for n even

$= \frac{4}{T}\int_0^{T/2} x(t)\sin(n\omega_0 t)$

UNIT – III

6. a) Find the Fourier Transform of the following signal.
   i) Sgn (t) ii) x (t) = e^{-at} u (t) [8M]

   b) Derive the expression for Fourier Transform for periodic signals. [4M]

(OR)

7. a) Find the total area under the function $x(t) = 10\,\mathrm{sinC}\left(\frac{t+4}{7}\right)$ using Fourier Transform properties. [6M]
   b) Consider an LTI system with impulse response h(t)=e^{-at} u(t). Find the response y(t) of this system when the input is the unit step function i.e; x(t)=u(t). [6M]

UNIT – IV

8. a) Use the convolution property of the Laplace transform to determine y(t)=e^{at} u(t) * e^{bt} u(t). [6M]
   b) Find the inverse Laplace transform of $H(S) = \frac{4S^2 + 15S + 8}{(S+2)^2(S-1)}$ [6M]

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(OR)

9. a) Determine the Laplace Transform of the signal $g(t)=\frac{1}{t}\sin(\omega t)\,u(t)$ using unilateral Laplace Transform. [6+6M]

   b) Find the Laplace Transform and ROC of the following damped sinusoidal signals

   i) $g_1(t)=e^{-at}\cos(\omega_o t)\,u(t)$ (ii) $g_2(t)=e^{-at}\sin(\omega_o t)$

UNIT – V

10. a) Determine the z-transform of the causal signal $x(n)=a^n u(n)$ and anticausal signal $x(n)=-a^n u(-n-1)$ and depict their ROCs and location of poles and zeros in the z-plane. [6+6M]

    b) Determine the z-transform of the sequence $g(n)=n\,a^n u(n)$.

(OR)

11. An LTI system is characterized by the system function $H(Z)=\frac{3-4Z^{-1}}{1-3.5Z^{-1}+1.5Z^{-2}}$ specify the ROC of H(Z) and determine h(n) for the following conditions. [12M]

    (i) The system is causal and unstable

    (ii) The system is non causal and stable

    (iii) The system is anti causal and unstable.

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AR13 SET-2

CODE: 13CS3008

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B.Tech I Semester Regular / Supplementary Examinations, November-2016

COMPUTER ORGANIZATION AND ARCHITECTURE
(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 X 10 = 10M]**

1. a) Write two functionalities of ALU.
   b) Define bus.
   c) List the representations of signed integers.
   d) What is Bias?
   e) Define hit ratio.
   f) What is the need for content addressable memory?
   g) What is Arithmetic pipeline?
   h) Give two advantages of RISC over CISC?
   i) What is processor arbitration?
   j) Name any two synchronization tools

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. (a) Explain the functional architecture of the computer system. [6M]
   (b) Explain performance equation of the processor [6M]

(OR)

3. (a) What is the difference between computer organization and architecture? Explain different types of computers. [6M]
   (b) Discuss about fixed point and floating point representations [6M]

UNIT-II

4. (a) Differentiate between non-restoring division algorithm and restoring division algorithm. [6M]
   (b) Explain hardware implementation of Binary multiplier with example. [6M]

(OR)

5 (a) What are the methods we can use to round the floating point numbers? [6 M]
   (b) Explain addition and subtraction of a floating point number. [6 M]

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UNIT-III

6	(a)	Explain the various addressing modes with examples.	[6 M]
	(b)	With a neat diagram explain the internal organization of a processor.	[6M]
		(OR)	
7	(a)	Explain the organization of registers.	[6M]
	(b)	What is micro-operation? Explain how Register Transfer Language is related to this with an example.	[6M]

UNIT-IV

8	(a)	Explain Techniques used to write Data in the Cache	[6 M]
	(b)	Distinguish between logical address and physical address with an example	[6 M]
		(OR)	
9	(a)	With a neat sketch explain the working principle of DMA	[6 M]
	(b)	Explain the I/O processor with a neat diagram.	[6 M]

UNIT-V

10	(a)	Explain Flynn's classifications of parallel computers	[6 M]
	(b)	Discuss in detail about No-operations, Instruction reordering and Data forwarding	[6 M]
		(OR)	
11	(a)	What is parallel processing? Explain any parallel processing mechanism.	[6M]
	(b)	Explain cache coherence with example	[6M]

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