AR13 SET-1

CODE: 13EC3018

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, Jan / Feb-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) Mention the properties of impulse function.
   b) Compare energy and power signals.
   c) Define singularity function.
   d) Mention the necessary conditions for a Fourier transform to exist.
   e) Mention the relation between Laplace Transform and Fourier Transform.
   f) Find the Laplace Transform of u (t).
   g) Mention the condition for Causality of an LTI system.
   h) What is the ROC of an infinite duration two sided sequence?
   i) What is the use of bilateral Z transform?
   j) Mention the properties of convolution.

PART-B

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

UNIT-I

2. Determine whether the system is (i) Memory less (ii) Stabel or not (iii) Causal (or) not (iv) Linear (or) not ($\surd$) time variant (or) not for $y(t) = \int_{-\gamma}^{2t} x(t)\ dt$ [12M]

3. a) Find the convolution of the two continuous time signals [6M]

   $x(t)=e^{-(t)}$ for all t and $h(t)=\begin{cases} e^{-2t}, t \geq 1 \\ 0 \quad t < 1 \end{cases}$

   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 $a^2 E_x$. [6M]

UNIT – II

4. For a even signal ie; x(t)=x(-t) prove that the trigonometric Fourier series coefficients are $a_0 = \frac{2}{T}\int_0^{T/2} x(t)\ dt$; $a_n \frac{4}{T}\int_0^{T/2} x(t)\cos(n\omega_0 t)dt$; bn=0. [12M]

(OR)

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5. a) Write down any three properties of Fourier series . [6M]
   b) Find the Fourier Series of a half wave rectified signal using exponential Fourier Series. [6M]

UNIT – III

6. a) Write down any two properties of Fourier transform. [6M]
   b) Find the Fourier Transform of (i) U(t) (ii) sgn (t). [6M]

(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) Find the Laplace Transform of the signal $x(t)=t^n\,u(t)$ [6+6M]
   b) Find the Laplace Transform and plot its ROC for the signal $x(t)=\sin(\omega_0 t)\,u(t)$.

(OR)

9. a) Check whether the following LTI system is Causal (or) Anti causal using ROC [6+6M]

   Properties of Laplace Transform for (i) $H(S) = \frac{1}{S^2+5S+6}\ \mathrm{R}\{S\} > -2$

   (ii) $H(S) = \frac{1}{S^2+5S+6}\ \mathrm{R}\{S\} < -3$

   b) State and prove final value theorem of Laplace Transform.

UNIT – V

10. a) Explain the relation between Z-transform and Laplace Transform using Z-plane to S-plane mapping. [6+6M]

    b) State and prove the final value theorem of Z-Transform.

(OR)

11. a) Find the inverse Z-transform:

    (i) $x(z) = \frac{1}{1-2z^{-1}}$ for |z|>2 (ii) $x(z) = \frac{1}{1-2z^{-2}+0.5z^{-1}}$ *for* $|z|>1$

    using partial fraction method

    b) Find the unilateral z-transform of the following signals (i) x(n+1) (ii)x(n+2)

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CODE: 13CS3008

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Supplementary Examinations, Jan / Feb-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) What is relative addressing mode? When is it used?
   b) Write the register transfer sequence for storing a word in memory.
   c) What is hard-wired control? How is it different from micro-programmed control?
   d) What is meant by data and control hazards in pipelining?
   e) What is meant by speculative execution?
   f) Define DMA.
   g) Define direct memory access transfer.
   h) What is meant by interleaved memory?
   i) Define pipeline.
   j) What does synchronous data stream means?

PART-B

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

UNIT-I

2. (a) With a neat diagram explain the internal organization of a processor. [6M]
   (b) Explain fixed point representation with example. [6M]

(OR)

3. (a) Explain floating point representation with example. [6M]
   (b) Explain the use of multiple-bus organization for executing a three-operand instruction. [6M]

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UNIT-II

4.		Design a 4-bit adder and explain its function in detail. .	[12M]

(OR)

5		What are the special registers in a typical computer? Explain their purposes in detail.	[12M]

UNIT-III

6	(a)	What are addressing modes? Explain the various addressing modes with examples.	[6M]
	(b)	Explain shift micro operation with example.	[6M]

(OR)

7	(a)	Discuss about instruction codes and instruction formats.	[6M]
	(b)	Explain arithmetic micro operation with example.	[6M]

UNIT-IV

8		Discuss the following: i) Interleaving ii) Hit rate and Miss penalty iii) Pre-fetching.	[12M]

(OR)

9	(a)	What are the steps in handling interrupts?	[6M]
	(b)	With a neat sketch explain the working principle of DMA.	[6M]

UNIT-V

10		Describe the techniques for handling data and instruction hazards in pipelining.	[12M]

(OR)

11	(a)	Discuss the basic concepts of pipelining.	[6M]
	(b)	Describe the data path and control considerations for pipelining.	[6M]

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