CODE: 13EC3018
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.TECH I SEM REGULAR EXAMINATIONS, NOVEMBER, 2015

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 a discrete time signal?

   b) Evaluate the value of $x(n)) = \sum_{n=-\infty}^{n=\infty} e^{3n} \delta(n-3)$?

   c) What is Fourier series?

   d) What are the types of symmetry that may be present in a waveform?

   e) Does Fourier transform exist for functions which are not absolutely integrable?

   f) What is the Fourier Transform of impulse function?

   g) What is Region of convergence?

   h) What is the relation between Laplace transform and Fourier transform?

   i) What is the necessary and sufficient condition for a discrete time system to be stable?

   j) How do you get the DTFT from the Z-transform ?

PART-B

Answer any one question from each unit   **[5 X 12 = 60 M]**

UNIT-I

2. a) Determine whether the following signal is energy signals or power signal   [6M]

$$x(n) = \sin\left(\frac{\pi}{3}n\right)$$

   b) Find even and odd components of the signal $x(t) = (1 + t^2 + t^3)\cos^2 10t$ [6M]

(OR)

3. check whether the following signals are   [12M]

   i). linear or non-linear   ii) causal or non-causal   iii) time-variant or time –invariant

   a) $y(t) = at^2 x(t) + btx(t-4)$ b) $y(n) = x^2(n) + \dfrac{1}{x^2(n-1)}$

4. a) Find the exponential Fourier series representation of the following signals

    i). $x(t) = 3\sin 4\omega_0 t$ ii) $x(t) = \cos^2 t$ [8M]

    b) State and prove convolution property of Fourier series   [4M]

(OR)

5. The voltage v(t) having the waveform shown in figure(b) is applied to the circuit shown in figure (a) determine the current i(t) using Fourier series.   [12M]
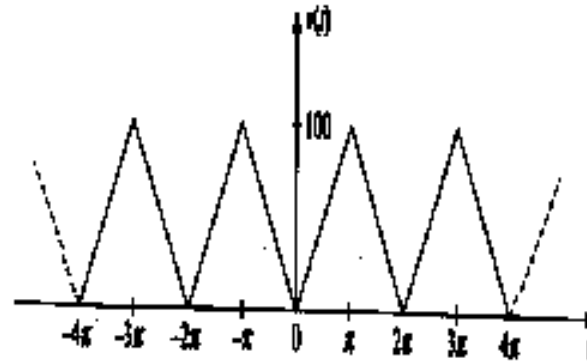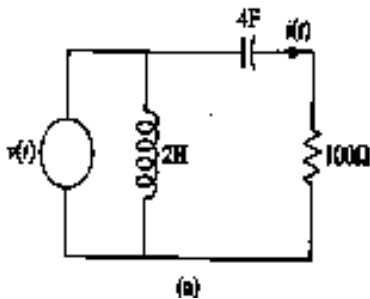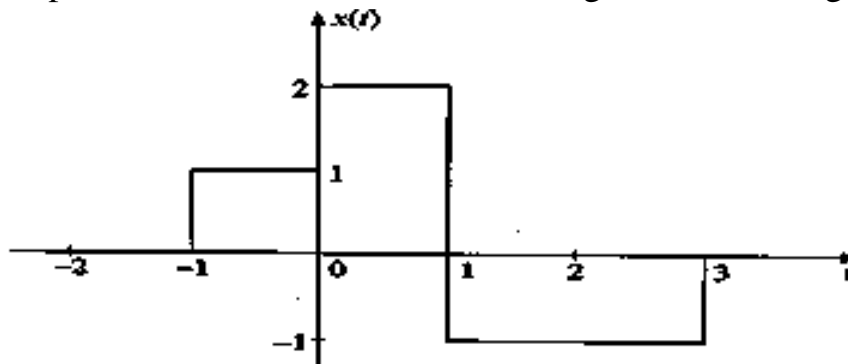

Figure (b)

UNIT-III

6. a) Find the Fourier transform of $x(t) = 5\sin^2(3t)$ [5M]

    b) Compute the Fourier transform for the signal shown in figure   [7M]

(OR)

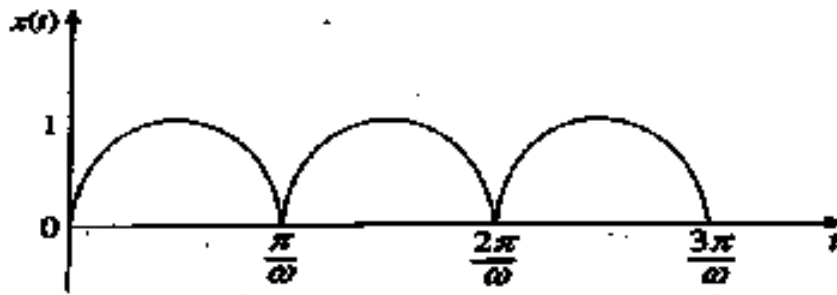7. a) Find the Fourier transform of Signum function   [5M]

    b) Find the Fourier transform of the function $x(t) = [u(t+2) - u(t-2)]\cos 2\pi t$ [7M]

UNIT-IV

8. a) Prove that the signals $x_1(t) = e^{-at}u(t)$ and $x_2(t) = -e^{-at}u(-t)$ have same Laplace transform X(s) for both signal and differ only in ROC. Also plot their ROC.   [6M]

    b) Find the Laplace transform of the full-wave rectifier shown in figure   [6M]

(OR)

9. a) Find the Laplace transform of following signals using properties of Laplace transform   [8M]

   i) $x(t) = \dfrac{1 - e^{-t}}{t}$ ii) $x(t) = e^{-5t} \sin 10at u(t)$

   b) Find the inverse Laplace transform of $X(s) = \log\left[\dfrac{s(s+1)}{s^2 + 1}\right]$
                                                                                      [4M]

UNIT-V

10. a) Find the Z-transform and ROC of $x(n) = 3\left(\dfrac{5}{7}\right)^n u(n) + 2\left(\dfrac{-1}{3}\right)^n u(n)$
                                                                                      [7M]

    b) Using long division method determine inverse Z-transform of   [5M]

    $$X(z) = \frac{z^2 + 2z}{z^3 - 3z^2 + 4z + 1}$$: ROC: $|Z| > 1$

(OR)

11. a) Determine whether the following system is both causal and stable   [5M]

    $$X(z) = \frac{3 + z^{-1}}{1 + z^{-1} - \left(\dfrac{4}{5}\right)z^{-2}}$$

    b) Find the inverse Z-transform $X(z) = \dfrac{z(z-1)}{(z+1)^3(z+2)}$ ROC: $|Z| > 2$ [7M]

    using partial fraction expansion method

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CODE: 13CS3008

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.TECH I SEM REGULAR EXAMINATIONS, NOVEMBER, 2015

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)   Define word length.
    b)   What are the merits and demerits of single address instructions?
    c)   List the advantages of multibus organization.
    d)   Define SCSI.
    e)   What is TLB?
    f)   What is DDR SDRAM?
    g)   What are the components of an I/O interface?
    h)   What is the role of cache in pipelining?
    i)   What is micro operation?
    j)   What would be the effect, if we increase the number of pipelining stages?

PART-B

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

UNIT-I

2. (a) Draw and explain the block diagram of a complete processor.   [6M]
    (b) Write in brief bus structure?   [6M]
                                    (OR)
3. (a) Explain fixed point representation with example.   [6M]
    (b) Explain floating point representation with example   [6M]

CODE: 13CS3008

UNIT-II

4. Explain with diagram and flow chart Booths multiplication algorithm for signed number .   [12M]

(OR)

5. Derive and explain an algorithm for adding and subtracting 2 floating point binary numbers.   [12M]

UNIT-III

6. (a) What do you mean by addressing modes? Explain the types of addressing modes that exists in modern processors.   [12M]

(OR)

7. (a) Explain the rules for basic arithmetic operations of floating point numbers.   [6M]
   (b) Explain Guard bit and Truncation.   [6M]

UNIT-IV

8. In a cache-based memory system using FIFO for cache page replacement, it is found that the cache hit ratio H is low. The following proposals are made for increasing.   [12M]
   - i)   Increase the cache page size
   - ii)   Increase the cache storage capacity
   - iii)   Increase the main memory capacity
   - iv)   Replace the FIFO replacement policy by LRU.

   Analyse each proposal to determine its probable impact on H.

(OR)

9. Explain the following: [12M]
   - i)   Interrupt priority schemes ii) DMA

UNIT-V

10. Discuss the data and control path methods in pipelining.   [12M]

(OR)

11. What is a data hazard? How do you overcome it? Discuss its side effects.   [12M]

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