

FACULTY OF INFORMATICS

B.E. 2/4 (IT) II Semester (Main) Examination, May/June 2011

SIGNALS AND SYSTEMS

Time : 3 Hours]

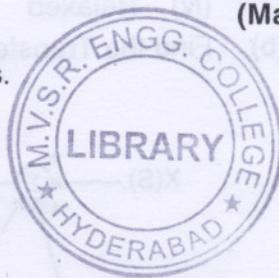
[Max. Marks : 75

Note : Answer **all** questions from Part – A. Answer any **five** questions from Part – B.

PART – A

(Marks : 25)

1. Mention any 3 types of classifications of signals. 2
2. Define and sketch sign function. 3
3. Find the Fourier Transform of $e^{-at} u_s(t)$. 2
4. Define Bandwidth and Band limit of a signal. 3
5. Differentiate energy and power signals. 3
6. Define Aliasing. 2
7. State the convolution property of Fourier Transform. 2
8. Find the 3-transform of $\left(\frac{1}{4}\right)^n u_s(n)$ and also indicate the ROC. 3
9. Check whether the system $y(n) = e^{x(n)}$ is linear or not. 2
10. Mention any 4 representations of systems. 3



PART – B

(Marks : 50)

11. (a) Find the exponential Fourier series representation of the signal $x(t) = \cos 4t + \sin 6t$. 6
 (b) Explain how signals can be represented as a sum of sinusoids. 4
12. (a) Explain about any 5 properties of Fourier Transform with suitable examples. 5
 (b) Find the Inverse Laplace Transform of $X(s) = \frac{3s + 4}{(s + 1)(s + 2)^2}$. 5
13. (a) Explain how signals can be reconstructed from their samples. 7
 (b) Define energy spectral density and power spectral density. 3

14. (a) Explain about auto correlation and cross correlation of signals. 4

(b) If $X(z) = \frac{z^2 + 7z + 12}{z^2 + 3z + 2}$, $\text{ROC} = |z| > 2$, find $x(n)$. 6

15. (a) Define the following system properties : 4

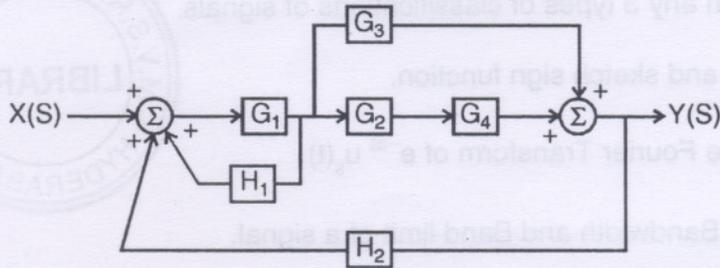
(i) Linear

(ii) BIBO stable

(iii) Causal

(iv) Relaxed

(b) Find the Transfer function of the given system : 6



16. (a) Solve the following using Laplace Transforms : 5

$$\ddot{y}(t) + 8\dot{y}(t) + 12y(t) = 2\dot{x}(t) + x(t)$$

$$\dot{y}(0) = 1, y(0) = 4 \text{ and } x(t) = u_s(t)$$

(b) Explain about representation of signals defined on intervals. 5

17. Write short notes on : 3

(a) Nyquist Sampling Theorem. 3

(b) State Space Representation. 3

(c) Coding and Quantization. 4