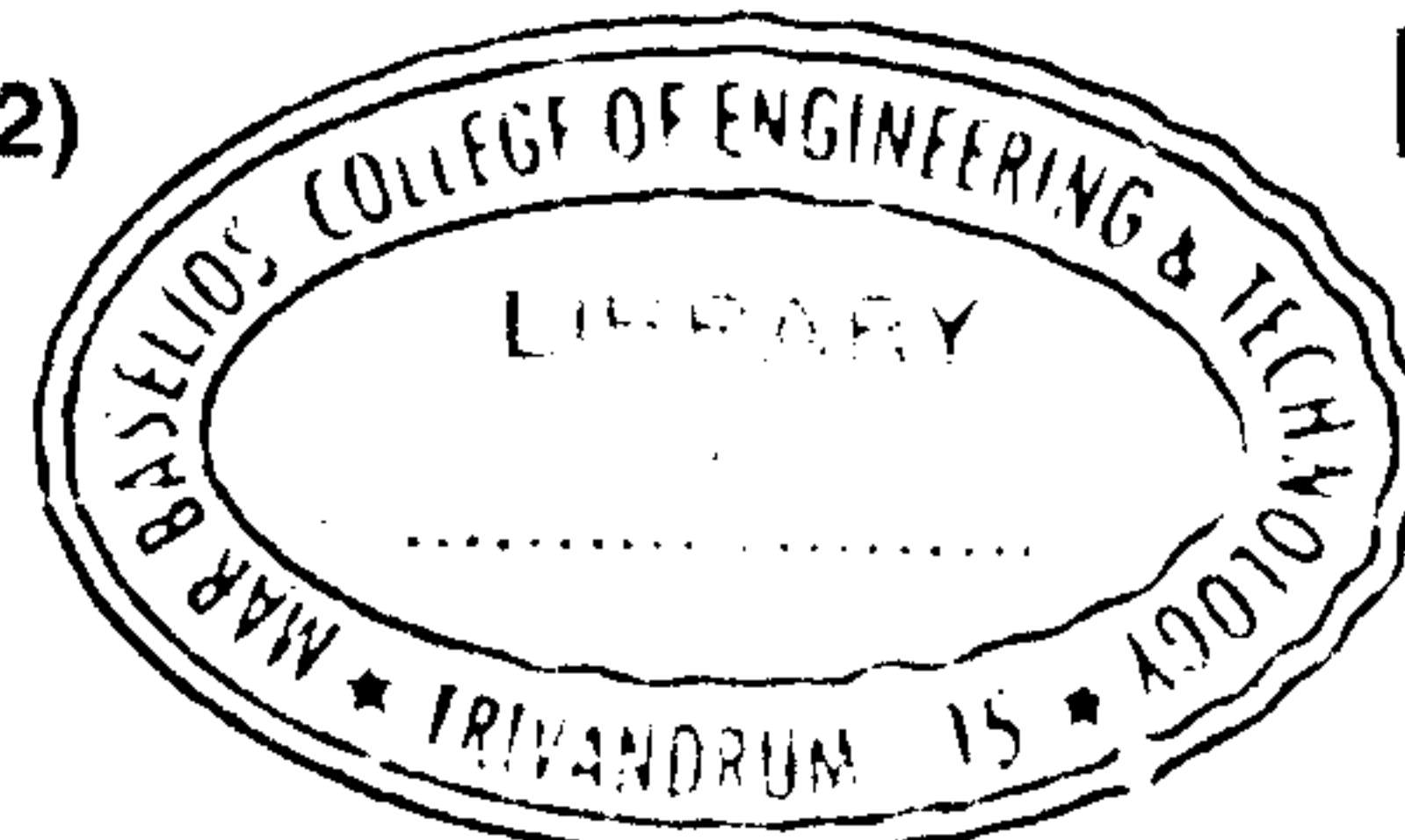




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F – 5720

**Third Semester B.Tech. Degree Examination, March 2019  
(2013 Scheme)  
13.302 : SIGNALS AND SYSTEMS (AT)**

Time : 3 Hours

Max. Marks : 100

**PART – A**

(Answer **all** questions. **Each** question carries **2** marks.)

1. What is the output obtained when a rectangular pulse is convolved by the same signal ?
2. Give the characteristics of the impulse response of a stable system.
3. Predict the position of poles of an oscillator in the S-plane.
4. What are the characteristics of transfer function of a stable system ?
5. How is the Hilbert Transform of a function found in frequency-domain ?
6. Find whether the system with response  $y(t) = 3x^2(t) + 2x(t) + 2$  is linear.
7. Differentiate between deterministic and stochastic signals.
8. Mention the role of RoC in determining the impulse response of a system.
9. Give the difference between DTFT and DFT.
10. What is Unilateral Laplace Transform ?

**PART – B**

(Answer **any one** question from **each** Module.)

**Module – I**

11. a) Using equations explain the condition for two signals to be orthonormal (orthogonal and normal). **10**  
b) Determine whether the signals  $3 \sin(25t)$  and  $4 \cos(50t)$  are orthogonal in an interval of  $2\pi$  second. **10**

P.T.O.



12. a) A system is represented using the difference equation  $y[n] = 4x[n] + k$ . Find whether the system is an LTI system. **10**
- b) Find whether the system  $y[n] = 4x[-n] + 2$  is causal, stable and time invariant. **10**

### Module – II

13. a) Find the Inverse Laplace Transform of  $\frac{S^2}{S^2 + 16} e^{3S}$ . **10**
- b) Evaluate the Fourier Transform of  $\frac{1}{\pi t} e^{2t}$ . **10**
14. a) Calculate the Power Spectral Density (PSD) of a signal having constant autocorrelation function of value 2 in the interval  $[-4, 4]$ . **10**
- b) Explain the criteria for distortionless transmission. **10**

### Module – III

15. a) Explain the principle of sampling band pass signals. **10**
- b) Discuss different methods of recovery of a sampled signal. **10**
16. a) Find the Hilbert transform of  $\sin(2t) + \cos(8t)$ . **10**
- b) Illustrate the use of Hilbert Transform in signal processing. **10**

### Module – IV

17. a) Find the DTFT of  $n^2 u[n]$ . **10**
- b) Give the properties of DTFT. **10**
18. a) Find the Inverse Z-Transform of  $\frac{Z^2}{Z - a}$ . **10**
- b) Find the magnitude response of a system represented by the transfer function  $H(Z) = 1 - Z^{-1}$ . **10**

