

College of Engineering Attingal  
Signals and Systems

Time 2 hours Max Mark 50

Answer all questions

1) Sketch  $x(t) = e^{2t}$  for values of  $t$  between -2 and 1. 4marks

2) Given  $x[n] = [1 \ 2 \ 3 \ 4 \ 5]$ . sketch  $x[-n]$   $x[2-n]$  and  $x[n/2]$

8 marks

3 Show that  $\cos(2x) = 1 - 2 \sin^2(x)$  ( Hint : use Euler's relation) 4 Marks

4 Determine whether  $x(t)$  is a power signal or energy signal. 5 marks

5 Determine which of the following signal is periodic .If periodic what is the fundamental period. 5 marks

a)  $x(t) = (\sin(4t-1))^2$

b)  $X[n] = \cos(4n + \pi/4)$

6 Given  $h[n] = [1 \ 2 \ 3 \ 1 \ 1]$   $x[n] = [2 \ 3 \ 4 \ 5 \ 6]$

Find  $x[n]*h[n]$  6 marks

7 Given  $h[n]$  and  $x[n]$  as depicted below, find  $x[n]*h[n]$  graphically

6 marks

8 Given  $h(t) = u(t) - u(t-4)$   $x(t) = u(t+1) - u(t-2)$ , find the convolution integral. 6 marks

8 An LTI has  $h[n] = 2^n u[3-n]$  Comment on its causality and stability.

(hint : sketch the graph)

6 marks