

# Unit 9 - Circuit Analysis Using Laplace Transform

## Course outline

### How to access the portal

### Unit 0

### Basic Circuit Elements and Waveforms

### Mesh and Node Analysis

### Network Theorems -1

### Network Theorems -2

### First Order and Second Order Circuits

### Laplace Transform and its Application

### Circuit Analysis Using Laplace Transform

 Laplace Transform of Circuit Elements

 Transfer Function

 Convolution Integral

 Graphical Approach of Convolution Integral

 Network Stability and Network Synthesis

 **Quiz : Assignment 7**
 Assignment 7 solution

 Feedback form for week 7

### Two Port Network

### Sinusoidal Steady State Analysis - 1

### Sinusoidal Steady State Analysis - 2

### State Variable Analysis

### Analogous Systems

## Assignment 7

The due date for submitting this assignment has passed.  
As per our records you have not submitted this assignment.

**Due on 2019-09-18, 23:59 IST.**

1) Suppose that  $f(t)=u(t)-u(t-2)$ . Determine  $f(t)*f(t)$  for  $2<t<4$ .

2 points

- 4-t  
 t-4  
 -t-4  
 t

No, the answer is incorrect.

Score: 0

Accepted Answers:

4-t

2) Given  $h(t) = 4e^{-2t}u(t)$ , and,  $x(t) = \delta(t) - 2e^{-2t}u(t)$ , find,  $y(t) = x(t) * h(t)$

2 points

- $4e^{-2t}u(t) - 8te^{-2t}u(t)$   
  $4e^{2t}u(t) - 8te^{-2t}u(t)$   
  $4e^{-2t}u(t) - 8te^{2t}u(t)$   
  $4e^{-2t}u(t) - te^{-2t}u(t)$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$4e^{-2t}u(t) - 8te^{-2t}u(t)$

3) A system has the transfer function

2 points

$$H(s) = \frac{s}{(s+1)(s+2)}$$

Find the impulse response of the system.

- $h(t) = (e^{-t} + 2e^{-2t})u(t)$   
  $h(t) = (-e^{-t} + 2e^{-2t})u(t)$   
  $h(t) = (-e^{-t} - 2e^{-2t})u(t)$   
  $h(t) = (-e^{-t} + 2e^{2t})u(t)$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$h(t) = (-e^{-t} + 2e^{-2t})u(t)$

4) Use Laplace Transform to find  $i(t)$  for  $t > 0$  if

0 points

$$\frac{d^2i}{dt^2} + 3\frac{di}{dt} + 2i + \delta(t) = 0$$

$$i(0) = 3, \quad i'(0) = 3$$

- $(4e^{-t} + 3e^{-2t})u(t)$   
  $(4e^{-t} - 3e^{-2t})u(t)$   
  $(3e^{-t} - 3e^{-2t})u(t)$   
  $(4e^{-t} - 4e^{-2t})u(t)$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$(4e^{-t} - 3e^{-2t})u(t)$

5) Given that  $v(0) = 2$  and  $dv(0)/dt = 4$ , solve

2 points

$$\frac{d^2v}{dt^2} + 5\frac{dv}{dt} + 6v = 10e^{-t}u(t)$$

- $v(t) = (5e^{-t} - 3e^{-3t})u(t)$   
  $v(t) = (4e^{-t} - 3e^{-3t})u(t)$   
  $v(t) = (5e^{-t} - 3e^{-2t})u(t)$   
  $v(t) = (9e^{-t} - 3e^{-3t})u(t)$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$v(t) = (5e^{-t} - 3e^{-3t})u(t)$