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**NPTEL** (<https://swayam.gov.in/explorer?ncCode=NPTEL>) » **Principles of Signals and Systems (course)**

Announcements (announcements)    **About the Course** ([https://swayam.gov.in/nd1\\_noc20\\_ee15/preview](https://swayam.gov.in/nd1_noc20_ee15/preview))

Ask a Question (forum)    Progress (student/home)    Mentor (student/mentor)

## Unit 4 - Week-1 Introduction to Signals and Systems, Signal Classification

### Course outline

How does an NPTEL online course work?

#### Week-0

#### Week-1 Introduction to Signals and Systems, Signal Classification

- ☒ Lecture-01: Principles of Signals and Systems- Introduction to Signals and Systems, Signal Classification – Continuous and Discrete Time Signals (unit? unit=28&lesson=29)
- ☐ Lecture 02 - Analog and Digital Signals (unit? unit=28&lesson=30)

## Assignment-1

The due date for submitting this assignment has passed. **Due on 2020-02-12, 23:59 IST.**

Assignment submitted on 2020-01-29, 11:46 IST

1) The signal  $e^t u(t)$  belongs to which of the following classes of signals?

1 point

- i Analog signals
- ii Energy signals
- iii Power Signals
- iv Deterministic Signals

- ☐ Only i and iv
- ☐ Only i, ii, and iv
- ☒ Only i, iii, and iv
- ☐ Only iii, iv

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*Only i and iv*

2) The value of  $\int_{-\infty}^{\infty} \sin(t) \delta'(t) dt$  is

1 point

- ☐ 0
- ☐ -1
- ☐ 1

☐ Lecture 03-  
Energy and  
Power Signals  
(unit?  
unit=28&lesson=31)

☐ Lecture 04-Real  
Exponential  
Signals (unit?  
unit=28&lesson=32)

☐ Lecture 05-  
Memory/Memory-  
less and  
Causal/ Non-  
Causal Systems  
(unit?  
unit=28&lesson=33)

☒ Quiz :  
Assignment-1  
(assessment?  
name=45)

☐ Feedback For  
Week 1 (unit?  
unit=28&lesson=57)

☒ Solution-1 (unit?  
unit=28&lesson=125)

## Week-2 Properties of LTI Systems

## Week-3 Examples on Properties of Linear Systems

## Week-4 Laplace Transform, Properties of Laplace Transform, Inverse Laplace Transform

## Week-5 Introduction to z- Transform, Properties of z- Transform, Region of Convergence, Inverse z- Transform

## Week-6 Examples Z-

☐  
 $\infty$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
-1

3) The signal  $x(n) = e^{j\frac{2\pi kn}{N}}$ , where  $k$  is an integer belongs to which of the following classes of signals?

- i Discrete time signals
- ii Power Signals
- iii Energy Signals
- iv Periodic Signals

- ☐ i, ii, iii and iv
- ☐ Only i, iii, and iv
- ☐ Only ii, iii and iv
- ☐ Only i, ii and iv

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
Only i, ii and iv

4) An LTI system has to satisfy

- ☐ Only additivity and homogeneity properties
- ☐ Only homogeneity and time-invariance properties
- ☐ Only additivity and time-invariance properties
- ☒ Additivity, homogeneity and time-invariance properties

Yes, the answer is correct.  
Score: 1

Accepted Answers:  
Additivity, homogeneity and time-invariance properties

5) The eigenfunction of an LTI system is of the form

- ☐  $\cos(2\pi f_0 t)$
- ☐  $\sin(2\pi f_0 t)$
- ☐  $e^{\alpha t}$
- ☐  $e^{-\beta t} u(t)$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $e^{\alpha t}$

6) The signal  $x(t) = \frac{\sin(5t)}{\pi t}$  is

- ☐ An energy signal with energy  $5\pi$

1 point

1 point

1 point

1 point

## Transform

Week-7 :  
Introduction to  
Fourier  
Transform,  
Properties of  
Fourier  
Transform,  
Frequency  
Response of  
Continuous Time  
Systems

Week-8  
Examples of  
Fourier  
Transform and  
Frequency  
Response

Week 9-  
Examples of  
Fourier  
Transform,  
Sampling and  
Fourier Analysis  
of Discrete time  
Signals

Week-10 Discrete  
Time Fourier  
Transform[DTFT]  
and Discrete  
Fourier  
Transform [DFT]

Week-11  
Examples on  
DTFT and DFT

Text Transcripts

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☐

A power signal with power  $10\pi$

☐

An energy signal with energy  $\frac{5}{\pi}$

☐

None of these

No, the answer is incorrect.

Score: 0

Accepted Answers:

*An energy signal with energy  $\frac{5}{\pi}$*

7) The odd component of the complex exponential signal  $e^{j\omega_o t}$  is

1 point

☐

$\sin(\omega_o t)$

☐

$\cos(\omega_o t)$

☐

$j \sin(\omega_o t)$

☐

$-\cos(\omega_o t)$

No, the answer is incorrect.

Score: 0

Accepted Answers:

*$j \sin(\omega_o t)$*

8) Consider the signal  $x(t) = 1 - 2|t|$  for  $|t| \leq 1$  and 0 otherwise. Let  $y(t) = x(4 - t)$ . Which of the following statements is true?

1 point

☐

$y(t)$  is increasing in the interval  $4 \leq t \leq 5$

☐

$\frac{d}{dt}y(t) = 2$  for  $3 \leq t < 4$

☐

$y(t)$  is decreasing in the interval  $-4 \leq t \leq -5$

☐

Peak of  $y(t)$  occurs at  $t = 4.5$

No, the answer is incorrect.

Score: 0

Accepted Answers:

*$\frac{d}{dt}y(t) = 2$  for  $3 \leq t < 4$*

9) The signal  $\cos^2(\frac{\pi}{8}n)$  is

1 point

☐

periodic with fundamental period  $N = 8$

☐

periodic with fundamental period  $N = 4$

☐

periodic with fundamental period  $N = 16$

☐

aperiodic

No, the answer is incorrect.

Score: 0

Accepted Answers:

*periodic with fundamental period  $N = 8$*

10) The value of  $\int_{-\infty}^{\infty} e^{-\beta t} \delta(\tau - \alpha t) dt$ , for  $\alpha > 0$ , is

**1 point**

☐

$$-\frac{\beta}{\alpha} e^{-\beta \alpha \tau}$$

☐

$$-\beta \alpha e^{-\frac{\beta}{\alpha} \tau}$$

☐

$$\frac{\beta}{\alpha} e^{-\beta \tau}$$

☐

$$\frac{1}{\alpha} e^{-\frac{\beta}{\alpha} \tau}$$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$$\frac{1}{\alpha} e^{-\frac{\beta}{\alpha} \tau}$$