Unit 4 - Week 2

Course outline

How to access the portal

Week 0 Assignment 0

Week 1

Week 2

- Lecture 8 : Fourier Transform
- Lecture 9 : Fourier Transform (Contd.)
- Lecture 10 : Fourier Transform (Contd.)
- Lecture 11 : Fourier Transform (Contd.)
- Quiz : Week 2 Assignment 2
- Feedback for Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

Download Videos

Detail Solution

Week 2 Assignment 2

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

Due on 2019-08-21, 23:59 IST.

1) If the Fourier transform of a complex signal, $x(t)$ is $X(f)$, then Fourier transform of $X(t)$ is given by: *1 point*

a. $x(-f)$

b. $x(f)$

c. $x^*(f)$

d. None of these

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

2) Amplitude response of a real signal is odd *1 point*

a. True

b. False

a.
b.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

3) The DC value of a real signal $x(t)$ is defined as $X(0)$ where $X(f)$ is the Fourier transform of the signal $x(t)$. If $X(0) < \infty$, the DC value of $x'(t) = \frac{d}{dt}x(t)$ is *1 point*

a. $2\pi X(0)$

b. 0

c. $4\pi X(0)$

d. $\pi X(0)$

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

4) Let, $y(t) = x(t-t_0)\sin(2\pi f_0 t)$, where $f_0 \gg f_m$ and $x(t)$ is a band limited signal with bandwidth f_m. If energy of $x(t)$ is E, find energy of $y(t)$. *1 point*

a. E

b. $\frac{E}{2}$

c. $\frac{E}{4}$

d. None of these

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

5) Let, $x(t)$ be a periodic function with period 2π. Within the period $[-\pi, \pi]$, $x(t) = t$. If, *1 point*

$$x(t) = \sum_{n=-\infty}^{\infty} c_n \exp(jnt)$$

is the exponential Fourier series of $x(t)$, then it is easy to show that $c_0 = 0$. Find c_n for $n \neq 0$.

a. $\frac{(-1)^n j}{n}$

b. $\frac{(-1)^n}{n^2}$

c. $\frac{(-1)^n}{n}$

d. $\frac{(-1)^n}{n^3}$

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

6) Using the results of previous question and applying Parseval's theorem, find the value of the following infinite sum: *1 point*

$$\sum_{n=1}^{\infty} \frac{1}{n^2}$$

a. $\frac{\pi^2}{2}$

b. $\frac{\pi^2}{3}$

c. $\frac{\pi^2}{6}$

d. $\frac{\pi^2}{12}$

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

7) Consider the following triangular pulse, *1 point*

$$x(t) = \begin{cases} 1 - \frac{|t|}{T}, & |t| \leq T \\ 0 & \text{elsewhere} \end{cases}$$

Find the Fourier transform, $X(f)$, of this signal.

a. $T\text{sinc}^2(\pi f T)$

b. $T^2\text{sinc}^2(\pi f T)$

c. $2T\text{sinc}^2(\pi f T)$

d. None of these

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

8) If $\triangle(t/T)$ is the function, $x(t)$ defined in Q7, find the Fourier transform, $X(f)$, of $x(t) = \text{sinc}^2(\pi T t)$. *1 point*

a. $\frac{1}{2T}\triangle(f/T)$

b. $\frac{1}{T}\triangle(f/T)$

c. $\frac{1}{T}\triangle(f/2T)$

d. None of these

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

9) Find the energy of the signal, $x(t)$, mentioned in Q8. *1 point*

a. 1

b. $\frac{1}{T}$

c. $\frac{1}{T^2}$

d. None of these

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

10) Find Fourier transform of the function, $x(t)$ as shown below. (Hint: Use differentiation Property): *1 point*

a. $\frac{cos(\pi f T)}{2j\pi^2 f^2}$

b. $\frac{sin(\pi f T)}{j\pi^2 f^2 T}$

c. $\frac{cos(\pi f T)}{j\pi^2 f^2 T}$

d. None of these

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.