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NPTEL

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Courses » Integral Equations,calculus of variations and its applications

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Unit 9 - Week 8

Course outline

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Week-1

Week 2

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Week 8

- Solution of integral equations using Fourier transform
- Solution of integral equations using Hilbert transform-I
- Solution of integral equations using Hilbert transform-II
- Calculus of variations: Introduction
- Calculus of

Assignment 8

The due date for submitting this assignment has passed. **Due on 2018-09-26, 23:59 IST.**
As per our records you have not submitted this assignment.

1) $\textit{The solution of the integral equation} \int_0^\infty f(x)\sin sx dx = e^{-s}, \textit{ is}$ *1 point*

- $\dfrac{2}{\pi(1+x^2)}$
- $\dfrac{2x}{\pi(1+x^2)}$
- $\dfrac{1}{\pi(1+x^2)}$
- $\dfrac{x}{\pi(1+x^2)}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\dfrac{2x}{\pi(1+x^2)}$

2) *1 point*

$$\textit{The solution of the integral equation} \int_0^\infty f(x)\cos sx dx = \left\{ \begin{array}{ll} 1, & 0 \le s < 1 \\ 2, & 1 \le s < 2 \\ 0, & s \ge 2 \end{array} \right\} \textit{is}$$

- $\dfrac{2}{\pi}(2\sin 2x - \sin x)$
- $\dfrac{2}{\ }(\sin 2x - 2\sin$

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No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{2}{\pi x}(2\sin 2x - \sin x)$

3) **1 point**

$The\ solution\ of\ the\ integral\ equation\ \int_0^\infty f(x)\sin sx dx = \left\{\begin{matrix} 1-s, & 0 \le s \le 1 \\ 0, & s > 1 \end{matrix}, \right\}\ is$

- $\frac{2}{\pi x^2}(x - \sin x$
- $\frac{2}{\pi x^2}(1 - \sin x)$
- $\frac{2}{\pi x}(1 - \sin x)$
- $\frac{2}{\pi x^2}(x - \cos x)$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{2}{\pi x^2}(x - \sin x$

4) **1 point**

$The\ solution\ of\ the\ integral\ equation\ \cos 2s = \frac{1}{\pi}\int_{-\infty}^{*\infty} \frac{f(t)dt}{s-t}\ is\ equal\ to$

- $\cos 2t$
- $\sin 2t$
- $-\cos 2t$
- $-\sin 2t$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\sin 2t$

5) **1 point**

$The\ solution\ of\ the\ integral\ equation\ \sin\frac{s}{2} = \frac{1}{\pi}\int_{-\pi}^{*\pi} \frac{f(t)dt}{t-s}\ is$

- $-\cos\frac{t}{2}$
- $\cos\frac{t}{2}$
- $-\sin\frac{t}{2}$
-

$\sin\frac{t}{2}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\cos\frac{t}{2}$

6) $The\ infinite\ Hilbert\ transform\ of\ the\ Dirac-delta\ function\ \delta(t)\ is$ **1 point**

- $\frac{1}{\pi s}$
- $\frac{1}{s}$
- $\frac{1}{\pi}$
- $\frac{1}{\sqrt{\pi s}}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\frac{1}{\pi s}$

7) $Let\ a\ functional\ I[y(x)]\ defined\ on\ the\ class\ C'[0,1]\ be\ given\ by$ **1 point**

$I[y(x)] = \int_0^1 [1 + y(x) + y'^2(x)]dx,$

$then\ which\ one\ is\ not\ false.$

- $I[x] = \frac{3}{2}$
- $I[1] = 1$
- $I[x^2] = \frac{8}{3}$
- $I[2x] = 7.$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$I[x^2] = \frac{8}{3}$

8) **1 point**

$Let\ a\ and\ b\ be\ two\ constants\ and\ y \in C'[a,b].\ Consider\ I[y] = \int_a^b [1 + y^2 + y'^2]dx$

$and\ J[y] = \frac{\int_a^b (y+y')dx}{\int_a^b (1+y'^2)dx}.\ Then$

- $I\ is\ linear\ but\ not\ a\ non\ local\ functional$
- $J\ is\ linear\ and\ a\ non\ local\ functional$
-

I *is non linear and a non local functional*

J *is non linear and a non local functional.*

No, the answer is incorrect.
Score: 0

Accepted Answers:
J *is non linear and a non local functional.*

9) **1 point**

Let $y \in C'[a,b]$, where a and b are two constants such that $a < b$. Consider $I[y] = y(\frac{a}{}$

and $J[y] = \int_a^b (2 + \sqrt{y(x)})dx$. Then

Both I and J are linear functionals

Neither I nor J is a linear functional

I is a linear functional

J is a linear functional.

No, the answer is incorrect.
Score: 0

Accepted Answers:
I is a linear functional

10) **1 point**

Consider the statements
(A) Every problem of geodesics may be considered as an isoperimetric problem.
(B) Every isoperimetric problem may be considered as a problem of geodesics
Then

only (A) is true

only (B) is true

both (A) and (B) are true

both (A) and (B) are false.

No, the answer is incorrect.
Score: 0

Accepted Answers:
only (A) is true

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