Assignment 6

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. **Due on 2018-09-12, 23:59 IST.**

1) **With the aid of resolvent kernel, the solution of the integral equation 1 point**

\[ \phi(x) = 1 - 2x - \int_{0}^{x} e^{x-t} \phi(t) \, dt, \text{ is} \]

- \( e^{x^2-2x} (1 + 2x) \)
- \( e^{x^2-2x} - 2x \)
- \( e^{x^2-2x} \)
- \( e^{x^2-2x} + 2x \)

No, the answer is incorrect.

**Score: 0**

**Accepted Answers:**
- \( e^{x^2-2x} - 2x \)

2) **With the aid of resolvent kernel, the solution of the integral equation 1 point**

\[ \phi(x) = xe^{x^2/2} + \int_{0}^{x} e^{-(x-t)} \phi(t) \, dt \text{ is} \]

- \( e^{x^2/2} (x + 1) - 1 \)
- \( e^{x^2/2} (x + 1) \)
- \( e^{x^2/2} \)

No, the answer is incorrect.

**Score: 0**

**Accepted Answers:**
- \( e^{x^2/2} (x + 1) \)

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3) The solution of the convolution type integral equation \( \phi(x) = e^x + 2 \int_0^x \cos(x-t)\phi(t)dt \), is

- \( e^x \)
- \( e^x (1 + x) \)
- \( e^x (1 + x)^2 \)
- \( e^x (1 + x^2) \)

No, the answer is incorrect.
Score: 0

Accepted Answers:
\( e^x (1 + x)^2 \)

4) The solution of the convolution type integral equation \( \phi(x) = e^{2x} + \int_0^x e^{t-x} \phi(t)dt \) is

- \( e^{2x} \)
- \( e^{x^2} \)
- \( e^{x^2}/2 \)
- \( (3e^{2x} - 1) \)
- \( (3e^{2x} - 1)/2 \)

No, the answer is incorrect.
Score: 0

Accepted Answers:
\( (3e^{2x} - 1)/2 \)

5) The solution of the system of integral equations \( \phi_1(x) = e^{2x} + \int_0^x \phi_2(t)dt, \phi_2(x) = 1 - \int_0^x e^{2(x-t)} \phi_1(t)dt \), is

- \( \phi_1(x) = e^x - 2 , \phi_2(x) = 2e^x - 3e^{2x} \)
- \( \phi_1(x) = 3e^x - 2 , \phi_2(x) = 2e^x - 3e^{2x} \)
- \( \phi_1(x) = 3e^x - 2 , \phi_2(x) = 3e^x - 2e^{2x} \)
- \( \phi_1(x) = e^x - 2 , \phi_2(x) = 3e^x - 2e^{2x} \)

No, the answer is incorrect.
Score: 0
6) The solution of the system of integral equations
\[ \phi_1(x) = x + \int_0^x \phi_2(t) \, dt \]
\[ \phi_2(x) = 1 - \int_0^x \phi_1(t) \, dt \]
\[ \phi_3(x) = \sin x + \frac{1}{2} \int_0^x (x-t) \phi_1(t) \, dt, \text{ is} \]

\[ \phi_1(x) = 2 \sin x, \quad \phi_2(x) = 2 \cos x, \quad \phi_3(x) = x \]

\[ \phi_1(x) = 2 \sin x, \quad \phi_2(x) = 2 \cos x + 1, \quad \phi_3(x) = x^2 \]

\[ \phi_1(x) = 2 \sin x, \quad \phi_2(x) = 2 \cos x - 1, \quad \phi_3(x) = x^2 \]

\[ \phi_1(x) = 2 \sin x, \quad \phi_2(x) = 2 \cos x - 1, \quad \phi_3(x) = x \]

No, the answer is incorrect.
Score: 0

Accepted Answers:
\[\phi_1(x) = 2 \sin x, \quad \phi_2(x) = 2 \cos x - 1, \quad \phi_3(x) = x\]

7) The solution of the Cauchy type integral equation
\[ x^2 = \int_{-2}^{2} \frac{y(t) \, dt}{(x^2 - t^2)^{\frac{1}{2}}} \quad 2 < x < 4 \text{ is} \]

\[ y(x) = \frac{4x(x^2-2)(x^2+4)^{-\frac{1}{2}}}{\pi} \]

\[ y(x) = \frac{4x(x^2+2)(x^2-4)^{-\frac{1}{2}}}{\pi} \]

\[ y(x) = \frac{4x(x^2-2)(x^2-4)^{-\frac{1}{2}}}{\pi} \]

\[ y(x) = \frac{4(x^2-2)(x^2-4)^{-\frac{1}{2}}}{\pi} \]

No, the answer is incorrect.
Score: 0

Accepted Answers:
\[ y(x) = \frac{4x(x^2-2)(x^2-4)^{-\frac{1}{2}}}{\pi} \]

8) The solution of the Cauchy integral equation
\[ x = \int_{-x}^{x} \frac{g(t) \, dt}{(t-x)^{\frac{1}{3}}}, \text{ is} \]

\[ g(x) = -\frac{3}{2\pi} (4-x)^{\frac{2}{3}} (8-3x) \]

\[ g(x) = -\frac{3\sqrt{3}}{2\pi} (4-x)^{\frac{2}{3}} (8-3x) \]

\[ g(x) = -\frac{3}{2\pi} (4-x)^{\frac{2}{3}} (3x-8) \]
9) The solution of Cauchy type integral equation

\[ 1 = \int_{\frac{x}{2}}^{x} \frac{g(t) \, dt}{(\cos t - \cos x)^{\frac{3}{2}}} , \quad \frac{\pi}{2} < x < \pi \text{ is} \]

\[ g(t) = \frac{1}{\pi} (\sin t)(-\cos t)^{\frac{1}{2}} \]

No, the answer is incorrect.
Score: 0
Accepted Answers:
\[ g(t) = \frac{1}{\pi} (\sin t)(-\cos t)^{\frac{1}{2}} \]

10) The solution of the Cauchy type integral equation

\[ x = \int_{x}^{4} \frac{u(t) \, dt}{(t - x)^{\frac{1}{2}}} , \quad 2 < x < 4 \text{ is} \]

\[ u(t) = -\frac{16}{5 \sqrt{2\pi}} (4 - t)^{\frac{1}{2}} (t + 1) \]

No, the answer is incorrect.
Score: 0
Accepted Answers:
\[ u(t) = -\frac{2\sqrt{2}}{\pi} (4 - t)^{\frac{3}{2}} (3 - t) \]