Assessment-7

The due date for submitting this assignment has passed. Due on 2019-03-20, 23:59 IST.
As per our records you have not submitted this assignment.

1) The transformation which maps the region \(0 < \arg(z) < \frac{\pi}{4}\) onto the left half of the \(w\) - plane, is given by:

- \(w = z^4\)
- \(w = -i z^4\)
- \(w = -z^4\)
- \(w = iz^4\)

No, the answer is incorrect.
Score: 0

Accepted Answers:
\(w = iz^4\)

2) Under the bilinear transformation \(w = \frac{z - 1}{z + 1}\), the circle \(|z - 1| = 1\) is mapped into:

- the circle with centre at \((-\frac{1}{2}, 0)\) and radius \(\frac{1}{2}\) in the \(w\) - plane
- the circle with centre at \((\frac{1}{2}, 0)\) and radius \(\frac{1}{2}\) in the \(w\) - plane
- the straight line \(v = -\frac{1}{2}\) in the \(w\) - plane
- the straight line \(u + v = 1\) in the \(w\) - plane

No, the answer is incorrect.
Score: 0

Accepted Answers:
the circle with centre at \((-\frac{1}{2}, 0)\) and radius \(\frac{1}{2}\) in the \(w\) - plane

3) The solution of the boundary value problem \(\frac{\partial^2 \phi}{\partial x^2} + \frac{\partial^2 \phi}{\partial y^2} = 0\), \(y > 0\):

\[
\lim_{x \to 0^+} \phi(x, y) = G(x) = \begin{cases} 
T_0, & x < 1 \\
T_1, & -1 < x < 1 \\
T_2, & x > 1 
\end{cases}
\]

where \(T_0, T_1\) and \(T_2\) are constants, is given by

\[
\phi(x, y) = (T_0 - T_1) \tan^{-1}\frac{y}{x-1} + (T_1 - T_2) \tan^{-1}\frac{y}{x+1} + T_2
\]

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\[ \phi(x, y) = \frac{(T_1 - T_2)}{\pi} \tan^{-1} \frac{x}{y} + (T_1 - T_2) \tan^{-1} \frac{y}{x} + T_2 \]

No, the answer is incorrect.
Score: 0

Accepted Answers:
\[ \phi(x, y) = \frac{(T_1 - T_2)}{\pi} \tan^{-1} \frac{y}{x} + (T_1 - T_2) \tan^{-1} \frac{y}{x} + T_2 \]

4) The Z - transform of the sequence \( u_n = e^{\pi n} \sin 2n, \quad n \geq 0 \), is

- \( \frac{e^z \sin 2z}{z^2 - 2e^z \cos 2z + e^{2z}}, \quad |z| > e^3 \)
- \( \frac{e^z \sin 2z}{z^2 - 2e^z \cos 2z + e^{2z}}, \quad |z| > e^3 \)
- \( \frac{e^z \sin 2z}{z^2 - 2e^z \cos 2z + e^{2z}}, \quad |z| > e^3 \)
- \( \frac{e^z \sin 2z}{z^2 - 2e^z \cos 2z + e^{2z}}, \quad |z| > e^3 \)

No, the answer is incorrect.
Score: 0

Accepted Answers:
\( \frac{e^z \sin 2z}{z^2 - 2e^z \cos 2z + e^{2z}}, \quad |z| > e^3 \)

5) The inverse Z - transform of the function \( U(z) = \frac{1}{(z - \frac{1}{2})^2(z - 1)} \), for the region \( \frac{1}{3} < |z| < \frac{1}{2} \), is

- \( u_n = \begin{cases} 12.2^n, & n \leq 0 \\ -\frac{6}{2^n}, & n \geq 1 \end{cases} \)
- \( u_n = \begin{cases} -12.2^n, & n < 0 \\ \frac{6}{2^n}, & n \geq 1 \end{cases} \)
- \( u_n = \begin{cases} 12.2^n, & n \leq 0 \\ -\frac{6}{2^n}, & n \geq 1 \end{cases} \)
- \( u_n = \begin{cases} -12.2^n, & n < 0 \\ \frac{6}{2^n}, & n \geq 1 \end{cases} \)

No, the answer is incorrect.
Score: 0

Accepted Answers:
\( u_n = \begin{cases} -12.2^n, & n < 0 \\ \frac{6}{2^n}, & n \geq 1 \end{cases} \)

6) Using convolution theorem, the inverse Z - transform of \( U(z) = \frac{1}{(z - 3)(z - 2)} \) for \( |z| > 3 \), is

- \( u_n = \begin{cases} 0, & n \leq 0 \\ 3^n - 2^n, & n \geq 1 \end{cases} \)
- \( u_n = \begin{cases} 0, & n \leq 0 \\ 3^n - 2^n, & n \geq 1 \end{cases} \)
- \( u_n = \begin{cases} 0, & n \leq 0 \\ 3^n - 2^n, & n \geq 1 \end{cases} \)
- \( u_n = \begin{cases} 0, & n \leq 0 \\ 3^n - 2^n, & n \geq 1 \end{cases} \)

No, the answer is incorrect.
Score: 0
7) If $Z$-transform of a sequence $(u_n)$ is $U(z) = \frac{2z^2+3n+4}{(z-3)^2}$, then the value of $u_3$ is $\theta$ point

- 35
- 48
- 139
- 21

No, the answer is incorrect.
Score: 0

Accepted Answers:

8) The inverse $Z$-transform of $\frac{z}{z+1}$, $|z| > 1$ is $\theta$ point

- $u_n = \begin{cases} 0, & n \leq 0 \\ \frac{1}{n+1}, & n \geq 1 \end{cases}$
- $u_n = \begin{cases} 0, & n \leq 0 \\ \frac{1}{n(n+1)}, & n \geq 1 \end{cases}$
- $u_n = \begin{cases} 1, & n \leq 0 \\ 0, & n \geq 1 \end{cases}$
- $u_n = \begin{cases} 0, & n \leq 0 \\ \frac{(-1)^n}{n}, & n \geq 1 \end{cases}$

No, the answer is incorrect.
Score: 0

Accepted Answers:

9) Using $Z$-transforms, the solution of the difference equation $u_{n+2} + 4u_{n+1} + 3u_n = 3^n$, $n \geq 0$ with $u_0 = 0$ and $u_1 = 1$, is $\theta$ point

- $u_n = \frac{1}{24}(3)^n + \frac{3}{8}(-1)^n - \frac{5}{12}(-3)^n$, $n \geq 0$
- $u_n = \frac{1}{4} \cdot 3^n + \frac{3}{8}(-1)^n - \frac{5}{12}(-3)^n$, $n \geq 0$
- $u_n = \frac{1}{24}3^n + \frac{3}{8}(-1)^n - \frac{1}{12}(-3)^n$, $n \geq 0$
- $u_n = \frac{1}{4} \cdot 3^n + \frac{3}{8}(-1)^n - \frac{1}{12}(-3)^n$, $n \geq 0$

No, the answer is incorrect.
Score: 0

Accepted Answers:

10) Using $Z$-transforms, the solution of the difference equation $u_{n+3} - 3u_{n+2} + 3u_{n+1} - u_n = y_n$, $n \geq 0$, where $u_0 = u_1 = u_2 = 0$, and $y_n$ is a unit step sequence, is $\theta$ point

- $u_n = \begin{cases} \frac{n(n+1)(n+2)}{6}, & n \geq 3 \\ 0, & n = 0, 1, 2 \end{cases}$

- $u_n = \begin{cases} \frac{n(n+1)(n+2)}{6}, & n \geq 3 \\ 0, & n = 0, 1, 2 \end{cases}$

- $u_n = \begin{cases} \frac{n(n+1)(n+2)}{6}, & n \geq 3 \\ 0, & n = 0, 1, 2 \end{cases}$
No, the answer is incorrect.
Score: 0

Accepted Answers:
\[ u_n = \begin{cases} \frac{n(n-1)(n-2)}{6}, & n \geq 3 \\ 0, & n = 0, 1, 2 \end{cases} \]
\[ u_n = \begin{cases} \frac{n(n-1)(n+1)}{6}, & n \geq 3 \\ 0, & n = 0, 1, 2 \end{cases} \]
\[ u_n = \begin{cases} \frac{n(n-1)(n+2)}{6}, & n \geq 3 \\ 0, & n = 0, 1, 2 \end{cases} \]