

Integral Transforms and Vector Calculus_SY_DIV_A_C_24-25

Started on Saturday, 21 September 2024, 7:30 PM

State Finished

Completed on Saturday, 21 September 2024, 8:20 PM

Time taken 50 mins

Grade 20.00 out of 20.00 (100%)

Question 1

Correct

Mark 3.00 out of 3.00

$$L^{-1}\left\{\frac{1}{(s^2 + 9)(s^2 + 4)}\right\}$$

(a) $\frac{\sin(2t)}{10} - \frac{\sin(3t)}{15}$ (b) $\frac{\sin(2t)}{2} - \frac{\sin(3t)}{3}$
(c) $\frac{\sin(3t)}{15} - \frac{\sin(2t)}{10}$ (d) $5\left[\frac{\sin(3t)}{3} - \frac{\sin(2t)}{2}\right]$

Select one:

- ☐ d
- ☐ b
- ☐ c
- ☒ a

The correct answer is: a

Question 2

Correct

Mark 3.00 out of 3.00

Find $L\left\{\int_0^t u \cosh 2u \, du\right\}$

(a) $\frac{-(s^2+4)}{(s^2-4)^2}$ (b) $\frac{(s^2+4)}{(s^2-4)^2}$ (c) $\frac{(s^2+4)}{s(s^2-4)^2}$ (d) $\frac{-(s^2+4)}{s(s^2-4)^2}$

Select one:

- ☒ c
- ☐ d
- ☐ b
- ☐ a

The correct answer is: c

Question 3

Correct

Mark 7.00 out of 7.00

In Half range Sine Series for

$$f(x) = \begin{cases} x, & 0 < x < \frac{\pi}{2} \\ \pi - x, & \frac{\pi}{2} < x < \pi \end{cases}$$

(i) Formula used for $f(x)$ is

$$(a) f(x) = a_0 + \sum_{n=1}^{\infty} [a_n \cos nx + b_n \sin nx]$$

$$(b) f(x) = \sum_{n=1}^{\infty} [a_n \cos nx]$$

$$(c) f(x) = a_0 + \sum_{n=1}^{\infty} [a_n \cos nx] \quad (d) f(x) = \sum_{n=1}^{\infty} b_n \sin nx$$

☐ c ☒ d ☐ a ☐ b

The correct answer is: d

(ii) Formula used for b_n is

$$(a) \frac{2}{\pi} \int_0^{\pi} f(x) \cos nx dx \quad (b) \frac{1}{\pi} \int_0^{\pi} f(x) \sin nx dx$$

$$(c) \frac{2}{\pi} \int_0^{\pi} f(x) \sin nx dx \quad (d) \frac{2}{\pi} \int_{-\pi}^{\pi} f(x) \sin nx dx$$

☐ a ☐ d ☐ b ☒ c

The correct answer is: c

(iii) Value of b_n is

$$(a) \frac{4 \sin\left(\frac{n\pi}{2}\right)}{\pi n^2} \quad (b) \frac{4 \sin\left(\frac{n\pi}{2}\right)}{n^2} \quad (c) \frac{\sin\left(\frac{n\pi}{2}\right)}{\pi n^2} \quad (d) \frac{2 \sin\left(\frac{n\pi}{2}\right)}{\pi n^2}$$

☐ c ☐ d ☐ b ☒ a

The correct answer is: a

(iv)

Value of $b_3 =$

$$(a) \frac{-4}{9\pi} \quad (b) \frac{-4}{9} \quad (c) \frac{-1}{\pi} \quad (d) \frac{1}{\pi}$$

☐ d ☒ a ☐ c ☐ b

The correct answer is: a

Question 4

Correct

Mark 2.00 out of 2.00

For $f(x) = 4 - x^2$ in the interval $(0, 2)$, the value of Fourier coefficient b_8 is

Select one:

☐

$$\frac{1}{\pi}$$

☐

$$\frac{2}{\pi}$$

☐

$$0$$

☒

$$\frac{1}{2\pi}$$

The correct answer is:

$$\frac{1}{2\pi}$$

Question 5

Correct

Mark 2.00 out of 2.00

For the given periodic function

$f(t) = \begin{cases} 2t & \text{for } 0 \leq t \leq 2 \\ 4 & \text{for } 2 \leq t \leq 6 (=T) \end{cases}$ the coefficient a_1 of the continuous Fourier series associated with the given function $f(t)$ can be computed as

Select one:

☒

$$-0.9119$$

☐

$$-9.2642$$

☐

$$-8.1275$$

☐

$$-0.5116$$

The correct answer is: -0.9119

Question 6

Correct

Mark 3.00 out of
3.00

$$L^{-1}\left\{\frac{s-5}{s^2-10s}\right\}$$

(a) $e^{5t} \cosh(5t)$ (b) $e^{5t} \sinh(5t)$ (c) $e^{-5t} \cosh(5t)$ (d) $e^{-5t} \sinh(5t)$

Select one:

- ☐ d
- ☐ c
- ☐ b
- ☒ a

The correct answer is: a

IA-2 Marks
distribution ►