Topics: Laplace Transform

Q.1.If $L^{-1}\left[\frac{e^{-1/s}}{\sqrt{s}}\right]=\frac{\cos 2\sqrt{t}}{\sqrt{\pi t}}$ then $L^{-1}\left[\frac{e^{-1000/s}}{\sqrt{s}}\right]$?

a) $\frac{\cos 2\sqrt{1000t}}{\sqrt{\pi t}}$ b) $\frac{\cos 2\sqrt{2000\,t}}{\sqrt{\pi t}}$ c) $\frac{\cos 2\sqrt{3000\,t}}{\sqrt{\pi t}}$ d) $\frac{\cos 2\sqrt{4000\,t}}{\sqrt{\pi t}}$

Ans. a) $\frac{\cos 2\sqrt{1000\,t}}{\sqrt{\pi t}}$

Q.2.Laplace transform of $H[(t-900)]=\begin{Bmatrix}0, t<900\\1, t>900\end{Bmatrix}$

a) $\frac{e^{-900s}}{s}$ b) $\frac{e^{900s}}{s}$ c) $\frac{e^{-1800s}}{s}$ d) $\frac{e^{1800s}}{s}$

Ans. a) $\frac{e^{-900s}}{s}$

Q.3.Find $L^{-1}\left[\overline{f}(100,s)\right]$?

a) $\frac{1}{100}f\left(\frac{t}{100}\right)$ b) $\frac{1}{200}f\left(\frac{t}{200}\right)$ c) $-\frac{1}{100}f\left(\frac{t}{100}\right)$ d) $-\frac{1}{200}f\left(\frac{t}{200}\right)$

Ans. a) $\frac{1}{100}f\left(\frac{t}{100}\right)$

Q.4.Find $L^{-1}\left[\frac{1}{(s-1000)^2+400}\right]$

a) $\frac{1}{20}e^{1000t}Sin20t$ b) $\frac{1}{-20}e^{-1000t}Sin20t$ c) $\frac{1}{10}e^{500t}Sin20t$ d) $\frac{1}{-10}e^{-500t}Sin20t$

Ans. a) $\frac{1}{20}e^{1000t}Sin20t$

Q.5.Laplace transform of Dirac delta function

a) 0 b)1 c) 2 d) 3

Ans. b)1

Q.6.If $L[f(t)] = \overline{f}(s)$ then $L[f(500t)]$

a) $\frac{1}{500}\overline{f}\left(\frac{s}{500}\right)$ b) $\frac{1}{-500}\overline{f}\left(\frac{s}{-500}\right)$ c) $\frac{1}{250}\overline{f}\left(\frac{s}{250}\right)$ d) $\frac{1}{-250}\overline{f}\left(\frac{s}{-250}\right)$

Ans. a) $\frac{1}{500}\overline{f}\left(\frac{s}{500}\right)$

Q.7. Find $L\left(\frac{Cos10\,t}{t}\right)$

a) 0 b) 1 c) 2 d) does not exist

Ans. d) does not exist

Q.8. If $L[f(t)] = \overline{f}(s)$ then $L\left[\int_0^t f(u)du\right]$

a) $\frac{\overline{f}(s)}{s}, s. > 0$ b) $\frac{\overline{f}(s)}{s}, s. < 0$ c) $\frac{\overline{f}(s)}{s}, s. = 0$ d) $\frac{\overline{f}(s)}{s}, s. \le 0$

Ans. a) $\frac{\overline{f}(s)}{s}, s. > 0$

Q.9.Laplace transform of unit step function

a) $\frac{e^{-as}}{s}$ b) $\frac{e^{-as}}{s+1}$ c) $\frac{e^{-as}}{s+2}$ d) $\frac{e^{-as}}{s+3}$

Ans. a) $\frac{e^{-as}}{s}$

Q.10. Value of $\int_0^\infty \left(\frac{e^{-1000t} - e^{-2000t}}{t} \right) dt$

a) log2 b) log 3 c) log 4 d) log 5

Ans. a) log2

Q.11. Find $L\left[\frac{1}{\sqrt{t}}\right]$

a) $\sqrt{\frac{\pi}{s}}, s > 0$ b) $\sqrt{\frac{\pi}{s+1}}$ c) $\sqrt{\frac{\pi}{s+2}}$ d) $\sqrt{\frac{\pi}{s+3}}$

Ans. a) $\sqrt{\frac{\pi}{s}}, s > 0$

Q.12. For existence of L.T. which is correct?

a) Sectionally continuous function b) Function of exponential order

c) Function of class A d) Function of inerrable

Ans. c) Function of class A

Q.13. Value of $L\left[e^{100t} Cos 200\, t\right]$

a) $\frac{s-100}{(s-100)^2 + 40000}$ b) $\frac{s+100}{(s+100)^2 - 40000}$ c) $\frac{s-50}{(s-50)^2 + 1000}$ d) $\frac{s+50}{(s+50)^2 - 1000}$

Ans. a) $\frac{s-100}{(s-100)^2 + 40000}$

Q.14.Lapace Transform is a ……

a) Linear transform b) binomial transform c) canonical transform d) none of these

Ans. a) Linear Transform

Q.15.Which function have Laplace Transform even it is not piecewise continuous in the range $t \geq 0$

a) $\frac{1}{\sqrt{t}}$ b) $\frac{1}{\sqrt{t^2}}$ c) $\frac{1}{\sqrt{t^3}}$ d) all of these

Ans. d) all of these

Q.16. If $L[f(t)] = \overline{f}(s)$ then $L\left(\frac{f(t)}{t}\right) = \int_s^\infty \overline{f}(u)du$, provided that

a) $Lim_{t\to\infty} \frac{f(t)}{t}$ *exist* b) $Lim_{t\to\infty} \frac{f(t)}{t}$ *does not exist* c) $Lim_{t\to\infty} \frac{f(t)}{t} = 1$ d) $Lim_{t\to\infty} \frac{f(t)}{t} = 0$

Ans. a) $Lim_{t\to\infty} \frac{f(t)}{t}$ *exist*

Q.17. which is the convolution property of L.T. ?

a) $f * g = \int_0^t f(u)g(t-u)du$ b) $f * g = \int_0^t f(u)g(t+u)du$

c) $f * g = \int_0^t f(t-u)g(t-u)du$ d) $f * g = \int_0^t f(u)g(t)du$

Ans. a) $f * g = \int_0^t f(u)g(t-u)du$

Q.18.Value of $L\left(\frac{1}{s^n}\right), n = 2,3,4....$

a) $\frac{t^n}{!(n-1)}$ b) $\frac{t^n}{!(n+1)}$ c) $\frac{t^n}{!(n-2)}$ d) $\frac{t^n}{!(n+2)}$

Ans. a) $\frac{t^n}{!(n-1)}$

Q.19. If $f(t)=\begin{cases}\sin t, & 0<t<\pi \\ -\sin t, & \pi<t<2\pi\end{cases}$ then fined L {f (t)}

a) $\dfrac{\int_0^{\pi} e^{-\pi s}\sin t\,dt}{1-e^{-s\pi}}$ b) $\dfrac{\int_0^{\pi} e^{\pi s}\sin t\,dt}{1+e^{-s\pi}}$ c) $\dfrac{\int_0^{\pi} e^{-\pi s}\sin t\,dt}{2-e^{-s\pi}}$ d) $\dfrac{\int_0^{\pi} e^{-\pi s}\sin t\,dt}{2+e^{-s\pi}}$

Ans. a) $\dfrac{\int_0^{\pi} e^{-\pi s}\sin t\,dt}{1-e^{-s\pi}}$

Q.20. If $[f(t)]=L^{-1}[\overline{f}(s)]$ then $L^{-1}\left(\dfrac{\overline{f(s)}}{s^n}\right)$

a) $\int_0^t\int_o^t\ldots\ldots\int_o^t f(t)dt^n$ b) $\int_0^t\int_o^t\ldots\ldots\int_o^t f(t+1)dt^n$ c) $\int_0^t\int_o^t\ldots\ldots\int_o^t f(t+2)dt^n$ d) $\int_0^t\int_o^t\ldots\ldots\int_o^t f(t+3)dt^n$

Ans. a) $\int_0^t\int_o^t\ldots\ldots\int_o^t f(t)dt^n$

Q.21. Value of $L\left(\dfrac{\sin 100t}{t}\right)$

a) $\sin^{-1}\left(\dfrac{100}{s}\right)$ b) $\cos^{-1}\left(\dfrac{100}{s}\right)$ c) $\tan^{-1}\left(\dfrac{100}{s}\right)$ d) $\cot^{-1}\left(\dfrac{100}{s}\right)$

Ans. c) $\tan^{-1}\left(\dfrac{100}{s}\right)$

Q.22. If $L[f(t)]=\overline{f}(s)$, then $L[e^{400t}f(t)]$

a) $\overline{f}(s-400)$ b) $\overline{f}(s+400)$ c) $\overline{f}(s-200)$ d) $\overline{f}(s+200)$

Ans. a) $\overline{f}(s-400)$

Q.23.Value of $L(\cosh 200t)$

a) $\frac{s}{s^2-40000}$ b) $\frac{s}{s^2+40000}$ c) $\frac{s}{s^2-20000}$ d) $\frac{s}{s^2+20000}$

Ans. a) $\frac{s}{s^2-40000}$

Q.24.If $g(t)=\begin{cases}\overline{f}(t-1000), t>1000\\ 0, \quad t<1000\end{cases}$ then L{g(t)

a) $e^{10^2 s}\overline{f}(s)$ b) $e^{10s}\overline{f}(s)$ c) $e^{-10^2 s}\overline{f}(s)$ d) $e^{-10s}\overline{f}(s)$

Ans. a) $e^{10^2 s}\overline{f}(s)$

Q.25. If $f(t)=L^{-1}\{\overline{f}(s)\}$ then $L^{-1}\left(\overline{f}(50s+100)\right)$

a) $\frac{1}{50}e^{-2t}f\left(\frac{t}{50}\right)$ b) $\frac{1}{50}e^{-2t}f\left(\frac{t}{100}\right)$ c) $\frac{1}{100}e^{-2t}f\left(\frac{t}{50}\right)$ d) $\frac{1}{10}e^{-2t}f\left(\frac{t}{10}\right)$

Ans. a) $\frac{1}{50}e^{-2t}f\left(\frac{t}{50}\right)$