

QUESTIONS WITH ANSWERS

Indian Institute of Technology, Kharagpur

Time: 40 minutes
Sub. No. MA 20101

Full Marks: 10
Subject Name: Transform Calculus

Autumn Semester 2018,
Deptt: CH/MF/PH.

Question 1. Compute

$$L^{-1} \left[\frac{4}{s^2 + 4s + 20} \right]$$

ANS: $\boxed{e^{-2t} \sin(4t)}$

Question 2. Find Laplace transform of the function

$$f(t) = \begin{cases} \sin t, & \text{for } 2n\pi < t < (2n+1)\pi; \\ 0, & \text{for } (2n+1)\pi < t < (2n+2)\pi. \end{cases}$$

for $n = 0, 1, 2, \dots$

ANS: $\boxed{\frac{1}{(1 - e^{-\pi s})(s^2 + 1)}}$

Question 3. Find

$$L^{-1} \left[\frac{4s + 5}{(s - 1)^2(s + 2)} \right]$$

ANS: $\boxed{\frac{1}{3}e^t + 3te^t - \frac{1}{3}e^{-2t}}$

Question 4. Evaluate

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

ANS: $\boxed{te^{-t} + t + 2e^{-t} - 2}$

Question 5. Evaluate

$$L^{-1} \left[\frac{2}{s\sqrt{s + 4}} \right]$$

in terms of error function.

ANS: $\boxed{\text{erf}(2\sqrt{t})}$

*****END*****