

**B.SC. VI SEM
DSE II – MATHEMATICS
PAPER – INTEGRAL TRANSFORM
HOME ASSIGNMENT**

MM: 20

Section – A

1x2 = 2 marks

1. Find the inverse Laplace Transform of the following.

निम्नलिखित का व्युत्क्रम लाप्लास रूपांतरण ज्ञात कीजिए।

i. $\frac{1}{p^{7/2}}$

ii. $\left(\frac{\sqrt{p-1}}{p}\right)^2$

Section – B

2 marks

2. Find (ज्ञात कीजिए।)

$L^{-1}\left(\frac{2p-1}{p^2-2p+10}\right)$

or $L^{-1}\left(\frac{1}{p^4} - \frac{3p}{p^2+16} + \frac{5}{p^2+4}\right)$

Section – C

3x2 = 6 marks

3. Find the inverse Laplace Transform of the following.

निम्नलिखित का व्युत्क्रम लाप्लास रूपांतरण ज्ञात कीजिए।

i. $\frac{2p^3+2p^2+4p+1}{(p^2+1)(p^2+p+1)}$

ii. $\log\left\{\frac{p+3}{p+2}\right\}$

iii. $\frac{p}{(p^2+1)^2}$

Section – D

5x2 = 10 marks

4. Show that by convolution theorem (संवलन प्रमेय से दर्शाइए)

$1 * 1 * 1 * \dots * 1$ (n times) = $\frac{t^{n-1}}{(n-1)!}$, Where $n= 1,2,\dots$

5. Find the value of (मान ज्ञात कीजिए)

$L^{-1}\left\{\frac{1}{(p+3)(p-1)}\right\}$

6. Apply Convolution theorem to prove that

संवलन प्रमेय से दर्शाइए की

$B(m, n) = \int_0^1 x^{m-1}(1-x)^{n-1}dx = \frac{\Gamma m \Gamma n}{\Gamma m+n}$, $n, m > 0$.

Hence deduce that

$\int_0^{\pi/2} \sin^{2m-1}\theta \cos^{2n-1}\theta d\theta = \frac{1}{2} B(m, n) = \frac{\Gamma m \Gamma n}{2\Gamma m+n}$