RAN-2503000504023001

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S.Y.B.Sc. (Sem - IV) Examination April - 2025

Mathematics : MH - MJ - 402

(Laplace Transform) Theory and Application (Paper - IX)

[Total Marks: 38

સૂચના : / Instructions

(૧) **નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.**
Fill up strictly the details of ☛ signs on your answer book

Name of the Examination:

☛ **S.Y.B.Sc. (Sem - IV)**

Name of the Subject :

☛ **Mathematics : MH - MJ - 402 (Laplace Tramtorm) Theory and Application (Paper - IX)**

Subject Code No.: **2503000504023001**

Seat No.:

Student's Signature

(2) Attempt all questions.

(3) Figures to the right indicate full marks.

(4) Follow usual notations and conventions

Q.1 Answer any Five from the following. **08**

1. Prove that $L(1) = \frac{1}{p}$
2. $L(\cosh 3t)$ = _____.
3. $L^{-1}\left(\frac{p}{p^2+4}\right)$ = _____.
4. State change of scale property for Laplace Transform.
5. $L(t^n F(t))$ = _____ . where $L(F(t)) = f(p)$.
6. State linearity property of inverse Laplace Transform.
7. State First Shifting property for Laplace Transform.
8. $L(t \sin t)$ = _____ .

Q.2 **Answer Any Two from the following.** **10**

1. Find Laplace Transform of $F(t) = \cos t \cos 2t \cos 3t$.
2. Find Laplace Transform of $F(t) = \begin{cases} \cos(t-2\pi) & ; t > 2\pi \\ 0 & ; t < 2\pi \end{cases}$ using second shifting theorem for Laplace transform.
3. Find Laplace Transform of $F(t) = \left(\frac{1-e^{-t}}{t}\right)$

Q.3 **Answer Any Two from the following.** **10**

1. Evaluate $\int_0^\infty e^{-2t} \sin^3 t \, dt$.
2. Find inverse Laplace transform of $g(p) = \frac{p}{p^2 - 2ap + 2a^2}$ using First shifting theorem.
3. Find inverse Laplace transform of $f(p) = \frac{p-3}{p(p-1)(p+1)}$

Q.4 **Answer Any Two from the following.** **10**

1. Find inverse Laplace transform of $f(p) = \frac{p^2}{(p^2+1)(p^2+4)}$ using convolution theorem for Laplace transform.
2. Find inverse Laplace transform of $f(p) = \frac{e^{4-3p}}{p+4}$.
3. Find inverse Laplace Transform of $f(p) = \frac{p}{p^2 a^2 + b^2}$.

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