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

Laplace Transforms Theory And Applications

Mathematics (MH-MJ-402)

[Total Marks: 25

સૂચના : / Instructions

(1) ઉપરોક્ત દર્શાવેલ વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the above details on your answer book
(2) Attempt all questions
(3) Figures to the right indicate full marks.
(4) Follow usual notations and conventions.

Seat No.:

Student's Signature

Q. 1 Answer any Five from the following. **05**

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

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 $F(t) = \begin{cases} \cos(t-2\pi); t > 2\pi \\ 0 \quad\quad\quad ; t < 2\pi \end{cases}$ 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. 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 $g(p) = \frac{p}{p^2-2ap+2a^2}$ using First shifting theorem.
3. Find inverse Laplace transform of $f(p) = \frac{p-3}{p(p-1)(p+1)}$.
