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S.Y.B.Sc. (Sem.–IV) Examination April - 2026

Mathematics-Laplace Transforms : Theory And Applications (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. $L^{-1}\left(\frac{p}{p^2-9}\right) =$ _____.
3. State linearity property of inverse Laplace Transform.
4. State change of scale property for Inverse Laplace Transform.
5. $L(e^t \sin t) =$ _____.
6. Define convolution for the functions of real variables.

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

1. Find Laplace Transform of $F(t) = \sin t \sin 2t \sin 3t$.
2. Find Laplace Transform of $F(t) = \begin{cases} \sin(t-2\pi); t > 2\pi \\ 0 \quad\quad\quad ; t > 2\pi \end{cases}$ 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 $f(p) = \frac{p-4}{p^2(p-1)(p+1)}$