

SEMESTER

III

QP CODE

23MAT33



P.R. GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA
SEM END EXAMINATIONS NOV -2024
II B.SC MATHEMATICS : LAPLACE TRANSFORMS

TIME: 2 HRS

DATE & SESSION	20.11.24 & AN	REG NO	2	3	2	4	A	T	3	2	MAX MARKS	50
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SECTION-A

Answer any three questions. Selecting at least one question from each part

Part - I

3 X 10 = 30

- Using the expansion $\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots$, show that $L\{\sin \sqrt{t}\} = \frac{\sqrt{\pi}}{2p^2} e^{-\frac{1}{4p}}$
- State and prove First Shifting theorem.
- Find $L\{\sinh at \cos at\}$

Part - II

- Using Laplace transform, evaluate $\int_0^{\infty} \frac{\cos at - \cos bt}{t} dt$
- Find $L^{-1} \left[\frac{3}{p^2-3} - \frac{3p+2}{p^3} - \frac{3p-27}{p^2+9} + \frac{6-30\sqrt{p}}{p^4} \right]$
- Apply Heaviside's expansion formula to find $L^{-1} \left[\frac{6p^2+22p+18}{p^3+6p^2+11p+6} \right]$

SECTION-B

Answer any four questions

4 X 5 M = 20 M

- Find the Laplace transform of $e^{2t} + 4t^3 - 2 \sin 3t + 3 \cos 3t$
- Find the Laplace transform of $e^t(3 \sin 2t - 5 \cosh 2t)$.
- State and prove Change of Scale property.
- Find $L\{te^{3t} \sin 2t\}$
- Find the Laplace transform of $\frac{e^{-at} - e^{-bt}}{t}$
- Find $L^{-1} \left[\frac{1}{(p+1)(p-2)} \right]$
- Evaluate $L^{-1} \left[\frac{p}{(p^2+a^2)^2} \right]$