
Department of Mathematical Sciences
Indian Institute of Technology (BHU), Varanasi-221005
Odd Semester 2020-2021
MA- 203 : Mathematical Methods
Tutorial Sheet – II

- **Notation** : Laplace transform of φ is notated as $L(\varphi)$, $J_0(\cdot)$ denotes the Bessel function of order zero and Heaviside unit function is denoted by $U(t - a)$.
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1. Let $L\{te^{2020t}\cos^2(2021t)\} = g(s)$. Then find $g(s)$.
 2. Prove/disprove : $L\{fg\} = L\{f\}L\{g\}$, provided $L\{f\}, L\{g\}$ exists.
 3. Evaluate the value of $L\{J_0(\alpha t)\}$, for any constant α , using the value of $L\{J_0(t)\}$.
 4. Find the value of $L\left\{\int_0^{\sqrt{t}} e^{-\tau^2} d\tau\right\}$.
 5. Let $L\{\sin(t - 2)U(t - 2)\} = f(s)e^{-2s}$. Then find $f(s)$.