

C 63107–A

B.A./B.Sc. (Three Year) DEGREE EXAMINATION, MARCH/APRIL 2018.

End Semester Examination

Sixth Semester

Mathematics

(Regular)

Paper VII (A) : LAPLACE TRANSFORMS

(Common for B.A./B.Sc.)

Time : 3 Hours

Max. Marks : 70

PART — A

Answer any FIVE of the following questions. (5 × 4 = 20 Marks)

1. Find $L\{(5e^{2t} - 3)^2\}$.

$L\{(5e^{2t} - 3)^2\}$ ని కనుగొనుము.

2. Find $L\{F(t)\}$ if $F(t) = \begin{cases} 0, & 0 < t < 1 \\ t, & 1 < t < 2 \\ 0, & t > 2 \end{cases}$.

$F(t) = \begin{cases} 0, & 0 < t < 1 \\ t, & 1 < t < 2 \\ 0, & t > 2 \end{cases}$ అయితే $L\{F(t)\}$ ని కనుగొనుము.

3. Find $L\{e^{-3t}(2\cos 5t - 3\sin 5t)\}$.

$L\{e^{-3t}(2\cos 5t - 3\sin 5t)\}$ ని కనుగొనుము.

4. IF $L\{F(t)\} = \frac{1}{s} e^{-\frac{1}{s}}$, prove that $L\{e^{-t}F(3t)\} = \frac{e^{-3/s+1}}{s+1}$.

$L\{F(t)\} = \frac{1}{s} e^{-\frac{1}{s}}$ అయితే $L\{e^{-t}F(3t)\} = \frac{e^{-3/s+1}}{s+1}$ అని చూపుము.

Turn Over

5. Find $L\{t^2 \cos 3t\}$.

$L\{t^2 \cos 3t\}$ ని కనుగొనుము.

6. Evaluate $L^{-1}\left\{\frac{e^{-3s}}{(s-4)^2}\right\}$.

$L^{-1}\left\{\frac{e^{-3s}}{(s-4)^2}\right\}$ ను గణించుము.

7. Find $L^{-1}\left\{\frac{3s-8}{4s^2+25}\right\}$.

$L^{-1}\left\{\frac{3s-8}{4s^2+25}\right\}$ ను కనుగొనుము.

8. Find $L^{-1}\left\{\frac{P^2}{(P-3)^2}\right\}$.

$L^{-1}\left\{\frac{P^2}{(P-3)^2}\right\}$ ని కనుగొనుము.

PART — B

Answer ALL the following questions.

(5 × 10 = 50 Marks)

9. (a) Find $L\{7e^{2t} + 9e^{-2t} + 5 \cos t + 7t^3 + 5 \sin 3t\}$.

$L\{7e^{2t} + 9e^{-2t} + 5 \cos t + 7t^3 + 5 \sin 3t\}$ ని కనుగొనుము.

Or

(b) Find $L\{F(t)\}$ where $F(t) = \begin{cases} (t-1)^2 & t > 1 \\ 0 & 0 < t < 1 \end{cases}$.

$F(t) = \begin{cases} (t-1)^2 & t > 1 \\ 0 & 0 < t < 1 \end{cases}$ అయితే $L\{F(t)\}$ ని కనుగొనుము.

10. (a) Find $L\{\cosh at \cos at\}$.

$L\{\cosh at \cos at\}$ ని కనుగొనుము.

Or

- (b) Find the Laplace transform of $G(t)$ where

$$G(t) = \begin{cases} \cos\left(t - \frac{\pi}{3}\right) & \text{if } t > \frac{\pi}{3} \\ 0 & \text{if } t < \frac{\pi}{3} \end{cases}$$

$$G(t) = \begin{cases} \cos\left(t - \frac{\pi}{3}\right), & t > \frac{\pi}{3} \\ 0, & t < \frac{\pi}{3} \end{cases} \text{ అయితే } G(t) \text{ కి లాప్లాస్ పరివర్తనను కనుగొనుము.}$$

11. (a) Show that $\int_0^{\infty} te^{-3t} \sin t \, dt = \frac{3}{50}$.

$$\int_0^{\infty} te^{-3t} \sin t \, dt = \frac{3}{50} \text{ అని చూపుము.}$$

Or

- (b) Prove that $L\{J_0(t)\} = \frac{1}{\sqrt{1+p^2}}$.

$$L\{J_0(t)\} = \frac{1}{\sqrt{1+p^2}} \text{ అని చూపుము.}$$

12. (a) Find $L^{-1}\left\{\frac{3p+1}{p^2-2p-3}\right\}$.

$$L^{-1}\left\{\frac{3p+1}{p^2-2p-3}\right\} \text{ ని కనుగొనుము.}$$

Or

- (b) Find $L^{-1}\left\{\frac{e^{-2p}}{p^2+4p+5}\right\}$.

$$L^{-1}\left\{\frac{e^{-2p}}{p^2+4p+5}\right\} \text{ ని కనుగొనుము.}$$

13. (a) Find $L^{-1}\left\{p \log\left(\frac{p-1}{p+1}\right)\right\}$.

$L^{-1}\left\{p \log\left(\frac{p-1}{p+1}\right)\right\}$ ని కనుగొనుము.

Or

(b) Find $L^{-1}\left\{\frac{3p+1}{(p-1)(p^2+1)}\right\}$.

$L^{-1}\left\{\frac{3p+1}{(p-1)(p^2+1)}\right\}$ ని కనుగొనుము.
