



		Unit	Regulation	year
1.	State the sufficient condition for the existence of Laplace transforms.	5	13	Apr/May 17 Dec/Jan 16 Nov/Dec 14 Nov/Dec 16
2.	Find $L\left(\sqrt{t} - \frac{1}{\sqrt{t}}\right)$	5	8	Apr/May 17
3.	Find the Laplace transform of $e^{-t} \sin 2t$ .	5	13	Nov/Dec 14
4.	Find the Laplace transform of $e^{-t} \int_0^t \frac{\sin t}{t} dt$	5	8	Dec/Jan 16
5.	Prove that $L\left(\int_0^t f(t) dt\right) = \frac{F(s)}{s}$ , when $L(f(t)) = F(s)$ .	5	13	Dec/Jan 16
6.	Find $L\left[\frac{\sin t}{t}\right]$	5	13	May/June 14
7.	Find $L[f(t)]$ if $f(t) = \begin{cases} e^{-t}, & 0 < t < 4 \\ 0, & t > 4 \end{cases}$	5	13	Noc/Dec 17
8.	Find the inverse Laplace of $\frac{s^2 - 3s + 2}{s^3}$	5	13	Apr/May 17
9.	Evaluate $L^{-1}\left[\frac{1}{s^2 + 6s + 13}\right]$	5	13	May/June 14
10	Find $L^{-1}\left(\log \frac{s}{s-a}\right)$ .	5	13	Dec/Jan 16
11	Evaluate $L^{-1}\left(\log \frac{s}{s^2 + 4s + 5}\right)$ .	5	13	May/June 16
12	State initial and final value theorem of Laplace transform.	5	8	Apr/May 17 Nov/Dec 14
13	Find $f(\infty)$ , if $L[f(t)] = \frac{1}{s(s+\infty)}$ .	5	13	Noc/Dec 17
14	State convolution theorem on Laplace transforms.	5	13	May/June 16
15	Find $f(t)$ if the Laplace transform $f(t)$ is $\frac{s}{(s+1)^2}$	5	13	Nov/Dec 14
16	Find the inverse Laplace of $\frac{s}{(s+2)^2}$	5	13	Nov/Dec 16

PART B				
1.	State second shifting theorem and also find $L^{-1}\left(\frac{e^{-s}}{\sqrt{s+1}}\right)$ .	5	13	Dec/Jan 16
2.	Find the Laplace transform of $f(t) = te^{-2t} \cos 3t$	5	13	Apr/May 17
3.	Find the Laplace transform of $f(t) = te^{-3t} \cos 3t$	5	13	May/June 14
4.	Find the Laplace transform of the following functions (1) $e^{-t} \cos t$ (2) $\frac{1 - \cos t}{t}$	5	13	Nov/Dec 14
5.	Find the Laplace transform of $f(t) = t^2 \sin at$	5	8	Dec/Jan 16
6.	Find the Laplace transform of the following functions (1) $\frac{e^{-t} \sin t}{t}$ (2) $t^2 \cos t$	5	13	Nov/Dec 16
7.	Find $L(e^{-t} \sin^2 3t)$ and $L\left(\frac{e^{-t} - \cos t}{t}\right)$ .	5	13	Dec/Jan 16
8.	Evaluate: $\int_0^{\infty} e^{-t} \left[ \frac{\cos 2t - \cos 3t}{t} \right] dt$	5	13	Apr/May 17
9.	(i) Find the Laplace transform of $f(t) = \frac{\cos at - \cos bt}{t}$	5	8	Dec/Jan 16
10.	Evaluate $\int_0^{\infty} \frac{e^{\sqrt{2t}} \sin \sqrt{2t}}{t} dt$	5	8	Apr/May 17
11.	Evaluate: (1) $L(t^2 e^{-t} \cos t)$ (2) $L^{-1}\left[ e^{-2s} \frac{1}{(s^2 + s + 1)^2} \right]$	5	13	May/June 16
12.	(i) Find the Laplace transform $f(t) = \frac{\sin^2 t}{t}$ . (ii) Find the value of $\int_0^{\infty} te^{-3t} \cos 2t dt$ .	5	8	Nov/Dec 14
13.	i) Evaluate $\int_0^{\infty} te^{-2t} t \sin 3t dt$ using Laplace transform and ii) $L^{-1}\left[\cot^{-1}\left(\frac{2}{s+1}\right)\right]$	5	13	Nov/Dec 17
14.	<b>Find the Laplace transform of the function</b> $f(t) = \begin{cases} a \sin \omega t, & 0 < t < \pi/\omega \\ 0, & \pi/\omega < t < 2\pi/\omega \end{cases}$ and $f(t + \frac{2\pi}{\omega}) = f(t)$	5	8	Apr/May 17 Dec/Jan 16 May/June 14
15.	<b>Find <math>L(f(t))</math> if <math>f(t) = \begin{cases} t, &amp; 0 \leq t \leq a \\ 2a - t, &amp; \text{if } a \leq t \leq 2a \end{cases}</math> and <math>f(t+2a) = f(t)</math>.</b>	5	8	Nov/Dec 14

16.	Find the Laplace transform of $f(t)$ defined by $f(t) = \begin{cases} E, & \text{if } 0 < t < a/2 \\ -E, & \text{if } a/2 < t < a \end{cases}$ where $f(t+a) = f(t)$	5	13	May/June 16 Nov/Dec 17
17.	Find the Laplace transform of the square wave function defined by $f(t) = \begin{cases} k & 0 < t < \frac{\alpha}{2} \\ -k & \frac{\alpha}{2} < t < \alpha \end{cases}$ $f(t+\alpha) = f(t)$	5	13	Nov/Dec 16
18.	Find the Laplace transform for $f(t) = \sin \frac{\pi t}{a}$ , such that $f(t+a) = f(t)$ .	5	13	Dec/Jan 16
19.	Find $L^{-1} \left\{ \log \frac{(s^2 - 4)}{(s-2)^2} \right\}$	5	13	Apr/May 17
20.	Find $L^{-1} \left( \frac{3s+1}{(s+a)^4} \right)$ .	5	13	Dec/Jan 16
21.	Apply convolution theorem to evaluate $L^{-1} \left\{ \frac{s^2}{(s^2+4)(s^2+9)} \right\}$	5	13	Apr/May 17 Nov/Dec 16
22.	Using convolution theorem find $L^{-1} \left( \frac{s}{(s^2+a^2)^2} \right)$	5	8	Apr/May 17
23.	Find $L^{-1} \left( \frac{1}{(s^2+a^2)^2} \right)$ using convolution theorem.	5	13	Nov/Dec 17
24.	(i) Find $L^{-1} \left( \log \frac{s^2+1}{s(s+1)} \right)$ (ii) Using convolution theorem, find y if $L(y) = \frac{s}{(s^2+a^2)^2}$ .	5	8	Nov/Dec 14
25.	Using convolution theorem, find the inverse Laplace transform of $\frac{s^2}{(s^2+a^2)(s^2+b^2)}$	5	8	Dec/Jan 16 May/June 14
26.	Find the inverse Laplace transform of $\frac{s}{(s^2+a^2)(s^2+b^2)}$ using convolution theorem.	5	13	May/June 16 Nov/Dec 14
27.	Using Laplace Transform, solve the differential equation $\frac{d^2 y}{dx^2} + 3 \frac{dy}{dt} + 2y = e^{-t}$ $y(0) = 1, y'(0) = 0$	5	13	Apr/May 17
28.	Use Laplace transform, solve $y'' - 4y' + 8y = e^t$ given that $y(0)=2, y'(0) = 1$	5	8	Apr/May 17
29.	Solve $\frac{d^2 x}{dt^2} + 9x = \cos 2t$ if $x(0) = 1, x\left(\frac{\pi}{2}\right) = -1$ , using Laplace transform technique	5	8	Dec/Jan 16
30.	Solve $x'' + 2x' + 5x = e^{-t} \sin t; x(0) = 0$ and $x'(0) = 1$ using Laplace transform.	5	13	Dec/Jan 16
31.	Using Laplace Transform, solve $\frac{d^2 y}{dt^2} + 4y = \sin 2t, y(0) = 3, y'(0) = 4$	5	13	May/June 14

32.	Using Laplace transform technique solve $y'' + y = t^2 + 2t$ , given $y=4$ , $y' = -2$ when $t=0$ .	5	13	May/June 16
33.	Solve $y''+9y = \cos 2t$ given that $y(0)=1$ and $y(\pi/2) = -1$ , by the method of Laplace transform	5	8	Nov/Dec 14
34.	Using Laplace transform, solve $y''+y'=t^2 + 2t$ when $y(0)=4$ , $y'(0)=-2$ .	5	13	Nov/Dec 17
35.	Using Laplace Transform, solve $(D^2 + 3D - 2)y = e^{-3t}$ given $y(0) = 1$ , $y'(0) = -1$	5	13	Nov/Dec 16
36.	Use Laplace transform to solve $(D^2-3D+2)y=e^{3t}$ with $y(0)=1$ and $y'(0)=0$	5	13	Nov/Dec 14

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