

Reg.No. _____

**Karunya UNIVERSITY**(Karunya Institute of Technology & Sciences)
(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)**Supplementary Examination – June – 2017****Code : 14MA2004****Duration : 3hrs****Sub. Name : Laplace Transforms Fourier series and Transforms****Max. marks : 100****ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

Q. No.	Sub Div.	Questions	Course Outcome	Marks														
1.	a.	Find $L(te^{-4t} \cos 2t)$.	CO1	10														
	b.	Find $L(e^{-2t} \cos^2 2t + 3 \cos 4t + \sin 2t \cos 2t)$	CO1	10														
(OR)																		
2.	a.	Find $L(\sinh 2t + t^4 + e^t \sin 3t + \cosh 3t + \sin^2 2t)$	CO1	10														
	b.	Find $L(\frac{\cos 2t - \cos 3t}{t})$	CO1	10														
3.	a.	Find $L^{-1}(\frac{s^2 - s + 2}{s(s + 2)(s - 3)})$ by using partial fraction	CO1	10														
	b.	Solve $y''(t) - 3y'(t) + 2y = e^{3t}$ given that $y(0) = 0$ and $y'(0) = 0$.	CO3	10														
(OR)																		
4.	a.	Find $L^{-1}(\frac{1}{s(s^2 + 1)})$ by using convolution theorem	CO1	10														
	b.	Find $L^{-1}(\frac{1}{(s^2 + \omega^2)^2})$	CO1	10														
5.	a.	Find the Fourier transform of $f(x)$, where $f(x) = \begin{cases} 1 - x^2, & x < 1 \\ 0, & x > 1 \end{cases}$ and hence evaluate $\int_0^\infty (\frac{x \cos x - \sin x}{x^3}) \cos \frac{x}{2} dx$	CO2	20														
(OR)																		
6.	a.	Find the finite Fourier sine and cosine transform of $f(x) = \begin{cases} 1, & 0 < x < \pi \\ -1 & \frac{\pi}{2} < x < \pi \end{cases}$	CO2	10														
	b.	Find the Fourier sine transform of $e^{- x }$.	CO2	10														
7.	a.	Find the Half range fourier sine series of $f(x) = x$ in $0 < x < \pi$	CO2	10														
	b.	Find Fourier series of $f(x) = x^2$ in $-\pi < x < \pi$	CO2	10														
(OR)																		
8.	a.	Find the half range Fourier cosine series for $f(x) = x, 0 < x < 2$	CO2	10														
	b.	Find the complex form of Fourier series of $f(x) = e^{-x}$ in $(-l, l)$	CO2	10														
<u>Compulsory:</u>																		
9.	a.	Determine the first three harmonics of the Fourier series for the following data.	CO2	20														
		<table><tr><td>X</td><td>0</td><td>60</td><td>120</td><td>180</td><td>240</td><td>300</td></tr><tr><td>Y</td><td>1.98</td><td>1.30</td><td>1.05</td><td>1.30</td><td>-0.88</td><td>-0.25</td></tr></table>	X	0	60	120	180	240	300	Y	1.98	1.30	1.05	1.30	-0.88	-0.25		
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ALL THE BEST

