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PES Institute of Technology, Bangalore

(Autonomous Institute under VTU, Belgaum)

12MA151

End semester assesment(ESA) B. E. I SEMESTER – November- 2015
ENGINEERING MATHEMATICS-II (Fast track)

Time:3 Hrs | Answer All Questions | Max Marks: 100

1.	a)	Solve linear differential equation of the form $\frac{dy}{dx}+y\cot x=\cos x$.	7
	b)	Solve $\left(x^2-4xy-2y^2\right)dx+\left(y^2-4xy-2x^2\right)dy=0$	7
	c)	Find orthogonal trajectories of family of circles $x^2+y^2=c^2$.	6
2.	a)	Solve $y''+4y'+4y=0$	7
	b)	. Solve $y''-5y'+6y=e^{4x}+3$	7
	c)	Find Laplace transform of $e^{-3t}\cos^2 2t$	6
3.	a)	Find $L\left[t^2\sin at\right]$	7
	b)	Find Laplace transform of $\frac{1-e^{at}}{t}$	7
	c)	.Find inverse Laplace transform of $\frac{s^2+s-2}{s(s+3)(s-2)}$	6
4.	a)	The particle moves along the curve $x=2t^2, y=t^2-4t,\ z=3t-5$,where t is time. Find the component of velocity and acceleration at t=1,in the direction $\hat{i}+3\hat{j}+2\hat{k}$	7
	b)	Find the values of a, b, & c if $\vec{F}=(3x+3y+az)\hat{i}+(bx+2y-4z)\hat{j}+(2x+cy+z)\hat{k}$ is Irrotational.	7
	c)	Find the directional derivative of $\phi=xy^2+yz^3$ at $(2,-1,1)$ in the direction $2\hat{i}+\hat{j}+2\hat{k}$	6
5.	a)	Find the unit normal to the surface $x^3+y^3+3xyz=3$ at $(1,2,-1)$.	7
	b)	Prove that $J_{1/2}(x)=\sqrt{\frac{2}{\pi x}}\sin x$	7
	c)	By using Rodrigue's formula ,prove that $P_n'(x)=xP_{n-1}'(x)+nP_{n-1}(x)$.	6