DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Examination – Summer 2022

Course: B. Tech. **Branch:** **Semester: III**

Subject Code & Name: BTBS301(Engineering Mathematics III)

Max Marks: 60 **Date:** **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		
A)	Find the Laplace Transform of $e^{4t}sin^3t$	CO1	6
B)	Evaluate $\int_0^\infty \frac{cosat-cosbt}{t}dt$ by using Laplace transform.	CO1	6
C)	Express in terms of Heaviside unit step function and find its Laplace transform. f(t) = sint, for, 0 < t < $\boldsymbol{\pi}$ = sin2t, for, $\boldsymbol{\pi}$ < t < $\boldsymbol{2\pi}$ = sin3t, for, t > $\boldsymbol{2\pi}$	CO1	6
Q.2	**Solve Any Two of the following.**		
A)	Find the inverse Laplace transform of $log(\frac{s+a}{s+b})$	CO2	6
B)	Find the inverse Laplace transform of $\frac{5s^2-15s-11}{(s+1)((s-2^2)}$	CO2	6
C)	Solve using Laplace transform $3\frac{dy}{dt}+2y=e^{3t}, y=1\ at\ t=0.$	CO2	6
Q. 3	**Solve Any Two of the following.**		
A)	Find the Fourier Transform of $f(x)=1, for\|x\|<1$ $=0, for\ \|x\|>1$ Hence evaluate that $\int_0^\infty \frac{sinx}{x}dx.$	CO3	6
B)	Find the Fourier cosine transform of e^{-x^2}	CO3	6
C)	Using Parseval's Identity, prove that $\int_0^\infty \frac{t^2}{(t^2+1)^2}dt=\frac{\pi}{4}$	CO3	6
Q.4	**Solve Any Two of the following.**		

A)	Form the partial differential equation by eliminating the arbitrary function from: $f(x+y+z\,, x^2+y^2+z^2)$	CO4	6
B)	Solve the partial differential equation: $(mz-ny)p+(nx-lz)q=ly-mx$.	CO4	6
C)	If the initial displacement and velocity of a string stretched between $x=0$ & $x=l$ are given by $y=f(x)$ & $\frac{dy}{dt}=g(x)$, determine the displacement y of any point at a distance x from one end at time t.	CO4	6
Q. 5	**Solve Any Two of the following.**		
A)	If $f(z)=u+iv$ is an analytic function and $u-v=e^x(cosy-siny)$, find $\boldsymbol{f(z)}$ in terms of $\boldsymbol{z}$.	CO5	6
B)	Find the bilinear transformation that maps the points $\boldsymbol{z=0, -1, i}$ into the points $\boldsymbol{w=i, 0}, \infty$ respectively.	CO5	6
C)	Use Cauchy's Integral formula to evaluate $\oint_C \frac{e^{2z}}{(z+1)^4}dz$, Where C is the circle $\lvert z\rvert=2$	CO5	6
	***** End *****		

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