DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Mid Semester Examination – Oct 2018

Course: B. Tech In Civil/Comp/Electrical/IT/Mech **Sem: III**

Subject Name: Engineering Mathematics-III **Subject Code: BTBSC301**

Max Marks: 20 **Date:-08/10/2018** **Duration:- 1 Hr.**

Instructions to the Students:

1. All the questions are compulsory
2. Use of non programmable calculator is allowed
3. Figures to right indicate full marks.

		(Level/CO)	Marks
Q. 1	**Attempt all of the following**		**6**
	1. $L\{t^m e^{bt}\} =$	Remember	
	(a) $\frac{\Gamma m}{(s+b)^m}$ (b) $\frac{\Gamma(m+1)}{(s-b)^{m+1}}$ (c) $\frac{(m+1)!}{(s+b)^{m+1}}$ (d) $\frac{m!}{(s-b)^m}$		
	2. $L\{\delta(t-a)\} =$	Remember	
	(a) e^{as} (b) e^{-as} (c) $\frac{e^{-as}}{s}$ (d) $\frac{e^{as}}{s}$		
	3. $L^{-1}\left\{\log\left(\frac{s+1}{s-1}\right)\right\} =$	Understand	
	(a) $\frac{2}{t}\cosh t$ (b) $\frac{2}{t}\sinh t$ (c) $2t\cosh t$ (d) $2t\sinh t$		
	4. $L^{-1}\left\{\frac{s^2-3s+4}{s^3}\right\} =$	Understand	
	(a) $1-3t-2t^2$ (b) $1+3t+2t^2$ (c) $1-3t+2t^2$ (d) None		
	5. The kernel of Fourier transform is	Remember	
	(a) e^{st} (b) e^{-st} (c) e^{ist} (d) None		
	6. Find the Fourier sine transform e^{-x} is	Apply	
	(a) $\frac{s}{s^2+1}$ (b) $\frac{1}{s^2+1}$ (c) $\frac{s}{s^2-1}$ (d) None		
Q.2	**Solve Any Two of the following.**		**3 X 2**
(A)	Evaluate using Laplace Transform: $\int_0^\infty e^{-3t}.t\cos t dt$	Apply /Evaluate	
(B)	Find Inverse Laplace Transform of: $\cot^{-1}(s+1)$	Understand	
(C)	Using Parseval's identity, Prove that. $\int_0^\infty \frac{1}{(t^2+1)^2} dt = \frac{\pi}{4}$	Apply /Evaluate	
Q. 3	**Solve Any One of the following.**		**8**
(A)	Solve the following using Laplace Transform $(D^2+2D+5)y = e^{-t}\sin t$, when $y(0)=0, y'(0)=1$	Apply /Evaluate	
(B)	Find Fourier Transform of $f(x) = \begin{cases} 1-x^2 & \text{for } \lvert x\rvert \le 1 \\ 0 & \text{for } \lvert x\rvert > 1 \end{cases}$ Hence Evaluate $\int_0^\infty \left(\frac{x\cos x - \sin x}{x^3}\right)\cos\frac{x}{2} dx$	Understand /apply /evaluate	

***** End *****