

Subject.Code: 18MAB201T

Subject.Name: Transforms and Boundary Value Problems

Year/Sem: II/III

Part-A (1*20=20)

Branch: Common to All branches

1.	The Fourier transform of a function $f(x)$ is	1 mark	
	a) $\frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} f(x) e^{ist} dt$ b) $\frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} f(x) e^{isx} dx$ c) $\frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} f(t) e^{isx} dx$ d) $\frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} f(s) e^{isx} dx$	Ans (b)	(CLO-4 Remember)
2.	The Fourier transform of $f(x) = e^{-\frac{x^2}{2}}$ is	1 mark	
	a) e^{-s^2} b) $\frac{1}{e^{\frac{s^2}{2}}}$ c) $\frac{1}{e^{-\frac{s^2}{2}}}$ d) $\frac{1}{e^{x^2}}$	Ans (a)	(CLO-4 Remember)
3.	The Fourier cosine transform of e^{-ax} is	1 mark	
	a) $\sqrt{\frac{2}{\pi}} \frac{a}{a^2 + x^2}$ b) $\sqrt{\frac{1}{\pi}} \frac{s}{s^2 + a^2}$ c) $\sqrt{\frac{1}{\pi}} \frac{a}{s^2 + a^2}$ d) $\sqrt{\frac{2}{\pi}} \frac{a}{s^2 + a^2}$	Ans (d)	(CLO-4 Remember)
4.	Under Fourier cosine transform $f(x) = e^{-a^2 x^2}$ is----	1 mark	

	--function		
	a) self-reciprocal b) cosine c) inverse function d) sine	Ans (a)	(CLO-4 Remember)
5.	The Fourier sine transform of $x e^{-\frac{x^2}{2}}$ is	1 mark	
	a) 0 b) $s e^{-\frac{s^2}{2}}$ c) $\frac{1}{s^2}$ d) 1	Ans (b)	(CLO-4 Remember)
6.	$F[f(ax)] = \frac{1}{a} F\left(\frac{s}{a}\right)$	1 mark	
	a) $\frac{1}{s} F\left(\frac{s}{a}\right)$ b) $\frac{1}{a} F\left(\frac{a}{s}\right)$ c) $\frac{1}{a} F\left(\frac{s}{a}\right)$ d) $\frac{1}{s} F\left(\frac{as}{a}\right)$	Ans (c)	(CLO-4 Remember)
7.	The $F[f(x-a)] =$	1 mark	
	a) $e^{ias} F(a)$ b) $e^{ias} F(x)$ c) $e^{iax} F(a)$ d) $e^{ias} F(s)$	Ans (d)	(CLO-4 Remember)
8.	$F[e^{iax} f(x)] =$	1 mark	
	a) $F(s+a)$ b) $F(s-a)$ c) $F(sa)$ d) $F(s/a)$	Ans (a)	(CLO-4 Remember)
9.	$F[f(x) \cos ax] =$	1 mark	
	a) $[f(a)+f(s-a)]/2$ b) $[f(sa)+f(s+a)]/2$ c) $[f(s+a)+f(s-a)]/2$ d) $[f(s+a)-f(s-a)]/2$	Ans (c)	(CLO-4 Remember)
10.	$F[f(x) * g(x)] =$	1 mark	
	a) $F(s) + G(s)$ b) $F(s) - G(s)$ c) $F(s)G(s)$ d) $F(s) G(s)$	Ans (c)	(CLO-4 Remember)

11.	If $F(s) = \mathcal{F}[f(x)]$ then $\int_{-\infty}^{\infty} f(x) ^2 dx =$	1 mark	
	a) $\int_{-\infty}^{\infty} f(x) ^2 dx$ b) $\int_{-\infty}^{\infty} f(s) ^2 ds$ c) $\int_0^{\infty} f(x) ^2 dx$ d) $\int_0^{\infty} f(s) ^2 ds$	Ans (b)	(CLO-4 Remember)
12.	$\mathcal{F}[xf(x)] =$	1 mark	
	a) $\frac{dF(s)}{ds}$ b) $i \frac{dF(s)}{ds}$ c) $-i \frac{dF(s)}{ds}$ d) $-\frac{dF(s)}{ds}$	Ans (c)	(CLO-4 Remember)
13.	$\mathcal{F}_C[xf(x)] =$	1 mark	
	a) $\frac{dF_S(s)}{ds}$ b) $i \frac{dF_S(s)}{ds}$ c) $-i \frac{dF_S(s)}{ds}$ d) $-\frac{dF_S(s)}{ds}$	Ans (a)	(CLO-4 Remember)
14.	$\mathcal{F}_S[xf(x)] =$	1 mark	
	a) $\frac{dF_C(s)}{ds}$ b) $i \frac{dF_C(s)}{ds}$ c) $-i \frac{dF_C(s)}{ds}$ d) $-\frac{dF_C(s)}{ds}$	Ans (d)	(CLO-4 Remember)

15.	The relation between Fourier transform and Laplace transform is	1 mark	
	a) $F[f(x)] = \frac{1}{\sqrt{2\pi}} L[g(x)]$ b) $F[f(x)] = \frac{1}{\sqrt{\pi}} L[g(x)]$ c) $F[f(x)] = \frac{1}{\sqrt{2}} L[g(x)]$ d) $F[f(x)] = \frac{-1}{\sqrt{\pi}} L[g(x)]$	Ans (a)	(CLO-4 Remember)
16.	The Fourier cosine transform of $F_c[e^{-4x}]$	1 mark	
	a) $\sqrt{\frac{2}{\pi}} \frac{4}{16+s^2}$ b) $\sqrt{\frac{2}{\pi}} \frac{4}{4+s^2}$ c) $\sqrt{\frac{\pi}{2}} \frac{4}{16+s^2}$ d) $\sqrt{\frac{\pi}{2}} \frac{4}{4+s^2}$	Ans (a)	(CLO-4 Remember)
17.	The Fourier transform of an odd function of x is	1 mark	
	a) an odd function of s b) even function of s c) an odd function of x d) even function of x	Ans (a)	(CLO-4 Remember)
18.	The Fourier transform of an even function of x is	1 mark	
	a) an odd function of s b) even function of s c) an odd function of x d) even function of x	Ans (b)	(CLO-4 Remember)
19.	The Fourier sine transform of $F_s[\frac{1}{x}]$	1 mark	
	a) $\sqrt{\frac{2}{\pi}}$ b) $\sqrt{\frac{1}{\pi}}$ c) $\sqrt{\frac{\pi}{2}}$ d) $\sqrt{\frac{\pi}{4}}$	Ans (c)	(CLO-4 Remember)

20.	$F[e^{ibx} f(x)] =$	1 mark	
	a) $F(s/b)$ b) $F(s+b)$ c) $F(bs)$ d) $F(s-b)$	Ans (b)	(CLO-4 Remember)
21	If $f(x)$ is a function in $(-1,1)$ and satisfies dirichlets conditions then	1 mark	
	a) $f(x) = \frac{1}{\pi} \int_0^\infty \int_{-\infty}^\infty f(t) \cos \lambda(t-x) dt d\lambda$ b) $f(x) = \frac{1}{\pi} \int_0^\infty \int_{-\infty}^\infty f(t) \cos x(t-x) dx d\lambda$ c) $f(x) = \frac{1}{2\pi} \int_0^\infty \int_{-\infty}^\infty f(t) \cos \lambda(t-x) dt d\lambda$ d) $f(x) = \frac{2}{\pi} \int_0^\infty \int_{-\infty}^\infty f(t) \cos \lambda(t-x) dt d\lambda$	Ans (c)	(CLO-4 Remember)
22	Under Fourier cosine transform $f(x) = \frac{1}{\sqrt{x}}$	1 mark	
	a) Self-reciprocal function b) Cosine function c) Inverse function d) Complex function	Ans (a)	(CLO-4 Remember)
23	If $F(f(x)) = F(s)$ and $f(x) \rightarrow 0$ as $x \rightarrow \pm\infty$ then $F(f'(x))$ is	1 mark	
	a) $-isF(s)$ b) $isF(s)$ c) $sF(s)$ d) $-F(s)$	Ans (a)	(CLO-4 Remember)
24	Find the Fourier sine transform of e^{-ax} , $a>0$	1 mark	
	a) $F_s[e^{-ax}] = \sqrt{\frac{2}{\pi}} \left[\frac{s}{s^2+a^2} \right]$ b) $F_c[e^{ax}] = \sqrt{\frac{2}{\pi}} \left[\frac{a}{s^2+a^2} \right]$ c) $F_s[e^{-ax}] = \sqrt{\frac{1}{\pi}} \left[\frac{s}{s^2+a^2} \right]$ d) $F_s[e^{ax}] = \sqrt{\frac{2}{\pi}} \left[\frac{s}{s^2+a^2} \right]$	Ans(a)	(CLO-4 Remember)

25	Find the Fourier Cosine transform of e^{-ax} , $a>0$	1 mark	
	a) $F_c[e^{-ax}] = \sqrt{\frac{2}{\pi}} \left[\frac{a}{s^2+a^2} \right]$ b) $F_c[e^{ax}] = \sqrt{\frac{2}{\pi}} \left[\frac{a}{s^2+a^2} \right]$ c) $F_s[e^{-ax}] = \sqrt{\frac{2}{\pi}} \left[\frac{s}{s^2+a^2} \right]$ d) $F_s[e^{ax}] = \sqrt{\frac{2}{\pi}} \left[\frac{s}{s^2+a^2} \right]$	An(a)	(CLO-4 Remember)
26	Modulation theorem $F[f(x)\cos ax]$	1 mark	
	a) $\frac{1}{2} [F(s+a) + f(s-a)]$ b) $\frac{1}{2} [F(s+a) - f(s-a)]$ c) $\frac{1}{4} [F(s+a) + f(s-a)]$ d) $\frac{1}{4} [F(s+a) + f(s-a)]$	Ans (a)	(CLO-4 Remember)
27	Find the fourier transform of $f(x) = \begin{cases} x, & x < a \\ 0, & x \geq a \end{cases}$	1 mark	
	a) $i \sqrt{\frac{2}{\pi}} \left[\frac{\sin a - a \cos a}{s^2} \right]$ b) $\sqrt{\frac{1}{\pi}} \left[\frac{\sin a - a \cos a}{s^2} \right]$ c) $i \sqrt{\frac{2}{\pi}} \left[\frac{\sin a - a \cos a}{s} \right]$ d) $i \sqrt{\frac{2}{\pi}} \left[\frac{\sin a - a \cos a}{s^3} \right]$	Ans (a)	(CLO-4 Remember)
28	Find the fourier transform of $f(x) = \begin{cases} 1, & x < a \\ 0, & x \geq a \end{cases}$	1 mark	
	a) $\sqrt{\frac{2}{\pi}} \left[\frac{\sin a}{s} \right]$ b) $\sqrt{\frac{1}{\pi}} \left[\frac{\sin a}{s^2} \right]$ c) $i \sqrt{\frac{2}{\pi}} \left[\frac{a \cos a}{s} \right]$	Ans (a)	(CLO-4 Remember)

	d) $i\sqrt{\frac{2}{\pi}} \left[\frac{\sin sa}{s^3} \right]$		
29	Find the fourier cosine transform of $e^{- x }$	1 mark	
	a) $\frac{\pi}{2} e^{- x }$ b) $\frac{\pi}{4} e^{- x }$ c) $\frac{\pi}{2} e^{ x }$ d) $\frac{1}{2} e^{- x }$	Ans (a)	(CLO-4 Remember)
30	Find the Fourier Cosine transform of $3e^{-5x} + 5e^{-2x}$	1 mark	
	a) $F_c[e^{-ax}] = \sqrt{\frac{2}{\pi}} \left[\frac{15}{s^2+25} + \frac{10}{s^2+4} \right]$ b) $F_s[e^{-ax}] = \sqrt{\frac{2}{\pi}} \left[\frac{15}{s^2+25} + \frac{10}{s^2+4} \right]$ c) $F_c[e^{-ax}] = \sqrt{\frac{1}{\pi}} \left[\frac{15}{s^2+25} + \frac{10}{s^2+4} \right]$ d) $F_s[e^{-ax}] = \sqrt{\frac{1}{\pi}} \left[\frac{15}{s^2+25} + \frac{10}{s^2+4} \right]$	Ans (a)	(CLO-4 Remember)
31	Find the Fourier sine transform of e^{-3x}	1 mark	
	a) $F_s[e^{-ax}] = \sqrt{\frac{2}{\pi}} \left[\frac{s}{s^2+3^2} \right]$ b) $F_c[e^{ax}] = \sqrt{\frac{2}{\pi}} \left[\frac{a}{s^2+3^2} \right]$ c) $F_s[e^{-ax}] = \sqrt{\frac{1}{\pi}} \left[\frac{s}{s^2+3^2} \right]$ d) $F_s[e^{ax}] = \sqrt{\frac{2}{\pi}} \left[\frac{s}{s^2+3^2} \right]$	Ans (a)	(CLO-4 Remember)
32	Find the Fourier sine transform of $\frac{1}{x}$	1 mark	

	a) $\sqrt{\frac{\pi}{2}}$ b) $\sqrt{\frac{\pi}{4}}$ c) $\sqrt{\frac{1}{2}}$ d) $\sqrt{\frac{1}{\pi}}$	Ans(b)	(CLO-4 Remember)
33	Find the Fourier transform of $e^{-a^2 x^2}$.	1 mark	
	(a) $F(S) = \frac{1}{\sqrt{2}} e^{\frac{-s^2}{4a^2}}$ (b) $F(S) = \frac{1}{\sqrt{3}} e^{\frac{-s^2}{4a^2}}$ (c) $F(S) = \frac{1}{a\sqrt{4}} e^{\frac{-s^2}{4a^2}}$ d) $F(S) = \frac{1}{a\sqrt{2}} e^{\frac{-s^2}{4a^2}}$	Ans (d)	(CLO-4 Remember)
34	Find the Fourier cosine transform of e^{-x^2}	1 mark	
	(a) $\frac{\sqrt{\pi}}{2a} e^{-\frac{s^2}{4a^2}}$ (b) $\frac{1}{\sqrt{3}} e^{\frac{-s^2}{4a^2}}$ (c) $\frac{1}{a\sqrt{4}} e^{\frac{-s^2}{4a^2}}$ (d) $\frac{1}{a\sqrt{2}} e^{\frac{-s^2}{4a^2}}$	Ans (a)	(CLO-4 Remember)
35	evaluate $\int_0^{\infty} \frac{dx}{(x^2 + a^2)^2}$	1 mark	
	a) $\frac{\pi}{3a^2}$ b) $\frac{3\pi}{4a^3}$ c) $\frac{\pi}{4a^3}$ d) $\frac{\pi}{a^3}$	Ans(c)	(CLO-4 Remember)
36	Find the Fourier cosine transform of e^{-3x}	1 mark	

	a) $\sqrt{\frac{2}{\pi}} \left[\frac{3}{3^2+s^2} \right]$ (b) $\sqrt{\frac{2}{\pi}} \left[\frac{2}{4+s^3} \right]$ (c) $\sqrt{\frac{2}{\pi}} \left[\frac{b}{b+s^3} \right]$ (d) $\sqrt{\frac{2}{\pi}} \left[\frac{1}{1+s^2} \right]$	Ans (a)	(CLO-4 Remember)
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