Vivekananda College of Engineering & Technology, Puttur [A Unit of Vivekananda Vidyavardhaka Sangha Puttur ®] Affiliated to VTU, Belagavi & Approved by AICTE New Delhi			
CRM08	Rev 1.10	BS	25-02-2022

CONTINUOUS INTERNAL EVALUATION - 1

For Lateral Entry (Diploma) Students

Dept: BS	Sem: III CV	Sub: Transform Calculus, Fourier Series and Numerical Techniques	S Code: 18MAT31
Date: 26/02/2022	Time:1.00pm -2.30 pm	Max. Marks: 50	Elective: N

Note: Answer any 2 full questions, choosing one full question from each part.

QN		Questions	Marks	RBT	CO's
		PART A			
1	a	Obtain the Fourier series for the the function $f(x)=\|x\|$ in the interval $-\pi \le x \le \pi$	8	L2	CO2
	b	Find Half range cosine series for $f(x) = (x-1)^2$ in $0 \le x \le 1$	8	L2	CO2
	c	The following data gives the variation of periodic current over a period t(secs): 0, T/6, T/3, T/2, 2T/3, 5T/6, T A(amp): 1.98, 1.3, 1.05, 1.3, -0.88, -0.25, 1.98 Find the constant term and first harmonics	9	L2	CO2
		OR			
2	a	Obtain the Fourier series for the function $f(x) = \begin{cases} 1+\frac{2x}{\pi} & \text{for } -\pi \le x \le 0 \\ 1-\frac{2x}{\pi} & \text{for } 0 \le x \le \pi \end{cases}$	8	L2	CO2
	b	Express $f(x) = x$ as half range sine series in the interval $0 < x < 2$	8	L2	CO2
	c	Compute the constant term and the first two harmonics in the Fourier series of the function f(x) given by the following table x: 0, 1, 2, 3, 4, 5 y=f(x): 4, 8, 15, 7, 6, 2	9	L2	CO2

		PART B			
3	a	Obtain the Fourier cosine transform of $f(x) = \begin{cases} 4x, & \text{for } 0 < x < 1 \\ 4-x & \text{for } 1 < x < 2 \\ 0 & \text{for } 2 < x \end{cases}$	8	L2	CO3
	b	Find the Complex Fourier transform of $f(x) = \begin{cases} x \text{ for } \lvert x\rvert \le \alpha \\ 0 \text{ for } \lvert x\rvert > \alpha \end{cases}$	8	L2	CO3
	c	Find the Fourier transform of $f(x) = \begin{cases} 1 \text{ for } \lvert x\rvert \le 1 \\ 0 \text{ for } \lvert x\rvert > 1 \end{cases}$ and hence evaluate $\int_0^\infty \frac{\sin x}{x}\,dx$	9	L2	CO3
		OR			
4	a	Find the Fourier sine transform of $e^{-\lvert x\rvert}$ and hence show that $\int_0^\infty \frac{x \sin mx}{1+x^2}\,dx = \frac{\pi}{2} e^{-m}$	8	L2	CO3
	b	Find the Fourier transform of $f(x) = \begin{cases} 1-x^2 & \text{for } \lvert x\rvert \le 1 \\ 0 & \text{for } \lvert x\rvert > 1 \end{cases}$	8	L2	CO3
	c	Find the inverse Fourier sine transform of $\frac{e^{-au}}{u}$ where $a > 0$ and hence obtain the inverse Fourier sine transform of $\frac{1}{u}$	9	L2	CO3

Prepared by: M Ramananda Kamath 25/2/22

25/2/2022