Question Bank

Department: Common for all **Semester: I** **Academic Year: 2024- 2025**

Class: F.Y.B.Tech. **Div: All** **Date:**

Course: Engineering Mathematics I & Linear Algebra And Differential Calculus

Unit VI –Fourier series

Q. No.	Question	Marks	CO	Blooms Level
Q.1	Find Fourier series to represent the function $f(x) = x$ For $-\pi < x < \pi$ and $f(x) = f(x + 2\pi)$	5	CO6	2
Q.2	Find half range cosine series for $f(x) = x^2, 0 < x < 2$	5	CO6	2
Q.3	Obtain constant term and coefficients of the first sine and cosine terms in the Fourier expansion of y as given in the following table. Given $f(x) = f(x + 2\pi)$.	5	CO6	3

x	0	$\frac{\pi}{3}$	$\frac{2\pi}{3}$	π	$\frac{4\pi}{3}$	$\frac{5\pi}{3}$
y	1.0	1.4	1.9	1.7	1.5	1.2

Q. 4	Find Fourier series for the function $f(x) = x^2 - 2$, $-2 \le x \le 2$, and $f(x) = f(x + 4)$.	5	CO6	2
Q.5	Find half-range sine series for $f(x) = \pi x - x^2$ where $0 < x < \pi$	4	CO6	2
Q.6	Find first three terms in cosine series to represent y as given in the following table.	3	CO6	3

x	0	1	2	3	4	5
y	4	8	15	7	6	2

Q.7	Find Fourier series for $f(x) = \left(\frac{\pi - x}{2}\right)^2$, $0 < x < 2\pi$ and $f(x) = f(x + 2\pi)$	5	CO6	2
Q.8	Find half-range sine series for $f(x) = 2x - 1, 0 < x < 1$.	5	CO6	2
Q.9	Obtain the constant term and the coefficients of the first sine and cosine term in the Fourier series of f(x) as given in the following table.	5	CO6	3

x	0	1	2	3	4	5
y	9	18	24	28	26	20

Q.10	Find half-range cosine series for $f(x) = x^2, 0 < x < \pi$	5	CO6	2
Q.11	Find Fourier series for $f(x) = x^3$; $where -\pi < x < \pi \; and \; f(x + 2\pi) = f(x)$	5	CO6	2

Course faculty