

## Assignment-1

Are the following functions odd, even, neither odd nor even

(a)  $x^2 \cos x$

(b)  $\sin x + \cos x$

(c)  $f(x) = e^{x^2}$

(d)  $\ln x$

(e)  $e^{|x|}$

(f)  $f(x) = x^4$  ( $0 < x < 2\pi$ )

(g)  $f(x) = \begin{cases} \cos^2 x, & \text{if } -\pi < x < 0 \\ \sin^2 x, & \text{if } 0 < x < \pi \end{cases}$

(h)  $e^{-|x|^2}$  ( $-\pi < x < \pi$ )

2. Determine half range Fourier sine series for  $f(x) = x(\pi - x)$  in  $0 < x < \pi$

hence deduce  $\frac{1}{1^3} + \frac{1}{3^3} + \frac{1}{5^3} + \dots = \pi^3/3^2$ .

3. Determine half range Fourier sine series for  $f(x) = e^x$  in  $0 < x < \pi$

4. Determine the half range Fourier sine series for

$$f(x) = \begin{cases} x, & 0 < x < \frac{\pi}{2} \\ \pi - x, & \frac{\pi}{2} < x < \pi \end{cases}$$

5. Determine the half range Fourier cosine series for

$$f(x) = \begin{cases} x, & 0 < x < \frac{\pi}{2} \\ \pi - x, & \frac{\pi}{2} < x < \pi \end{cases}$$

6. Find half-range Fourier cosine series for  $f(x) = x$  in  $(0 < x < 2\pi)$