



AB-3160

Third Year B. Sc. (Sem. V) Examination

March/April - 2015

Fourier Series - I

(Generic Elective - 5004) (1)

Time : 2 Hours]

[Total Marks : 50

Instruction :

(1)

नीचे दर्शायेव निशानीवाणी विगतो उत्तरवडी पर अवश्य कपनी. Fillup strictly the details of signs on your answer book.		Seat No. :
Name of the Examination :		<input type="text"/>
Third Year B. Sc. (Sem. V)		<input type="text"/>
Name of the Subject :		<input type="text"/>
Fourier Series - I (Generic Elective - 5004) (1)		<input type="text"/>
Subject Code No. :	<input type="text" value="3"/> <input type="text" value="1"/> <input type="text" value="6"/> <input type="text" value="0"/>	Student's Signature
Section No. (1, 2,.....) :	<input type="text" value="Nil"/>	

- (2) All questions are compulsory.
(3) Figures to the right indicate marks of the corresponding question.

1 Answer the following: (Any Five) 5

- (1) Define Fourier series.
- (2) Write Dirichlet's condition for Fourier expansion.
- (3) Define odd and even function. Hence state its properties.
- (4) Discuss about square wave form.
- (5) Write the complex form of Fourier series.
- (6) Discuss about modified saw-toothed wave form.
- (7) Define the root mean square value.

2 (a) State and prove Euler's formula. 7

OR

- (a) Discuss regarding the functions having points of discontinuity.
- (b) Attempt any one : 8

(1) Find the F.S. expansion for $f(x)$ if $f(x) = \begin{cases} -\pi; & -\pi < x < 0 \\ x; & 0 < x < \pi \end{cases}$

Also deduce that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots = \frac{\pi^2}{8}$

- (2) Obtain the Fourier series for $f(x) = e^{-x}$ in the interval $0 < x < 2\pi$.

- 3 (a) Define Half Range series, sine series and cosine series. 7

OR

- (a) Derive the formula for Fourier expansion of odd or even function.
- (b) Attempt any one : 8
- (1) Express $f(x) = x$ as a Fourier series in an interval $(-\pi, \pi)$.
- (2) Find the Fourier series of the function

$$f(x) = \begin{cases} 0; & -2 < x < -1 \\ k; & -1 < x < 1 \\ 0; & 1 < x < 2 \end{cases}$$

- 4 (a) State and prove Parseval's formula. 7

OR

- (a) Discuss about Practical Harmonic analysis in Fourier series.
- (b) Attempt any one : 8
- (1) Find complex form of the Fourier series of the $f(x) = e^{ax}; -l < x < l$.
- (2) Obtain the constant term and the coefficients of the first sine and cosine terms in the Fourier expansion of y as given in the following table :

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