

V.P. & R.P.T.P SCIENCE COLLEGE  
US03CELC-21  
First Internal Test

Date: 01/10/18  
3:00 p.m. to 4:15 p.m.  
Total Marks 25  
5 marks

Q1: Multiple choice questions:

- Signal is physical quantity which varies with -----variables.
  - Dependent
  - Independent
  - Dependent or independent
  - Dependent and independent
- The frequency band limits for Broadcast band is
  - 1.5 Hz to 100 KHz
  - 0.5 Hz Hz to 1.5 MHz
  - 100 KHz to 500 KHz
  - 20 Hz to 20 KHz
- The fourier series for  $f(x)$  in the interval  $\alpha < x < \alpha + 2\pi$  is given by

$$(i) f(x) = \frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos nx + \sum_{n=1}^{\infty} b_n \sin nx$$

$$(ii) f(x) = a_0 + \sum_{n=1}^{\infty} a_n \cos nx + \sum_{n=1}^{\infty} b_n \sin nx$$

$$(iii) f(x) = \frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \sin nx + \sum_{n=1}^{\infty} b_n \cos nx$$

(iv) None of the above

4. Laplace transform of  $\cos at$

- $s/s^2+a^2$
- $s/s^2-a^2$
- $a/s^2+a^2$
- $a/s^2+a^2$

5.  $\cos n\pi =$

- n
- $(-1)^n$
- 0
- 1

Q2 : Show classification of signals and describe in detail any one types of signals.

5 marks

OR

Q2 : Show pulse characteristics with neat diagram and explain 3 features of it.

5 marks

Q3 : Explain in detail working of function generator.

5 marks

OR

Q3: What are important blocks of sine wave generator and explain function of each block.

5 marks

Q4 : Prove that  $x^2 = \frac{\pi^3}{3} + 4 \sum_{n=1}^{\infty} (-1)^n \frac{\cos nx}{n^2}$

5 marks

OR

Q4(a) : Find  $a_0$  for the function  $f(x) = x \sin x$  in the fourier series for the interval  $-\pi < x < \pi$

3 marks

Q4(b): Differentiate even function and Odd function

2 marks

Q5 : Find Laplace's transform of (i)  $\sin 2t \sin 3t$  and (ii)  $e^{-3t}(2\cos 5t - 3\sin 5t)$

5 marks

OR

Q5 : Find Laplace's transform of (i)  $t^2 \cos at$  and (ii)  $\frac{\cos at - \cos bt}{t}$

5 marks

