

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2047

Roll No.

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**B.Tech.**

(SEM. III) ODD SEMESTER THEORY EXAMINATION

2010-11

**BASIC SYSTEM ANALYSIS**

Time : 3 Hours

Total Marks : 100

**Note :** (1) Attempt **all** the questions.

(2) Each question carries equal marks.

1. Attempt any **four** parts of the following : (5×4=20)

(a) What is a signal ? How signals are classified ? 5

(b) Differentiate periodic and non-periodic signals with suitable examples. 5

(c) Express the triangular waveform shown in Fig.1 using ramp functions. 5

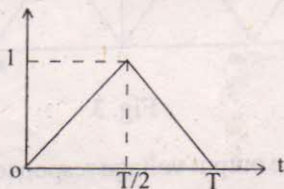


Fig.1.

(d) What is an analogous system ? Discuss. 5

(e) What are the electrical elements analogous to the mechanical translational elements ? How they are analogous ? Explain. 5

- (f) Draw the analogous electrical circuit of the given mechanical system shown in Fig.2. Use f-v analogy. Write the system equations. 5

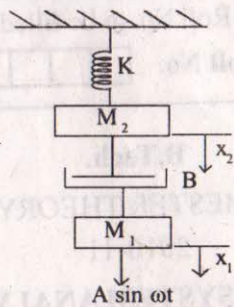


Fig.2

2. Attempt any **four** parts of the following : (5×4=20)

- (a) Explain exponential form of Fourier series. 5  
 (b) Discuss waveform symmetry with suitable examples. 5  
 (c) Determine the trigonometric Fourier series of the waveform shown in Fig.3. 5

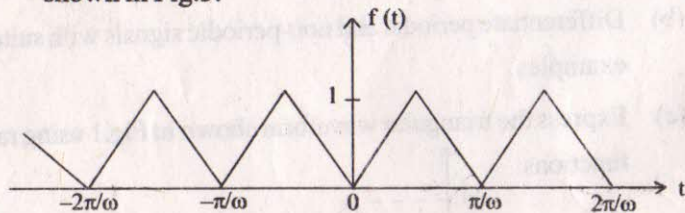


Fig. 3

- (d) Determine the output voltage response across the capacitor to a current source excitation  $i(t) = e^{-t}u(t)$ , as shown in Fig.4. 5

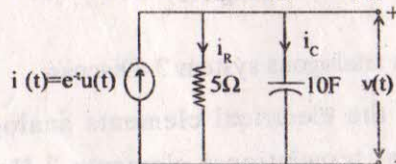


Fig. 4

5. Attempt any **two** parts of the following : (10×2=20)

- (a) Find the inverse Z-transform of the following functions :

(i)  $F(z) = \frac{2z+1}{(z-0.1)^2}$

(ii)  $F(z) = \frac{2z}{z^2 - 1.2z + 0.5}$  10

- (b) Derive Z-transforms of exponential function, and sine and cosine functions. 10

- (c) Solve the following difference equation using the Z-transform method :

$$x(k+2) + 5x(k+1) + 6x(k) = 0$$

$$x(0) = 0, \quad x(1) = 1.$$

- Discuss the significance of the difference equation. 10