

Roll No.

Total No. of Pages : 02

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B.Tech. (Electronics & Electrical Engineering) (Sem.-4)

SIGNALS AND SYSTEMS

Subject Code : BTEEE-404-18

M.Code : 77577

Date of Examination : 09-07-22

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

- a) State Dirichlet's conditions.
- b) What are the limitations of z-transform?
- c) What is the purpose of using Laplace transform?
- d) Define causal and linear system with examples.
- e) State and prove initial value theorem for Laplace transform.
- f) Verify the final value theorem for z-transform.
- g) Find the z-transform of $\sinh(\omega t)$.
- h) Derive the expression for the effective value of non-sinusoidal periodic waveform.
- i) Find the Fourier transform of a pulse.
- j) What is the Fourier transform of a unit impulse signal?

SECTION-B

2. State and prove the modulation property of Fourier transform.
3. Find the Laplace transform of $\cosh(\omega t)$.
4. Find the z-transform of $a^n \cosh(\omega t)$
5. Obtain the z transforms of $\nabla^2 x(k)$ and $\Delta x(k)$.
6. Find the final value of the function :

$$F(z) = \frac{0.792z^2}{(z-1)(z^2 - 0.416z + 0.208)}$$

SECTION-C

7. Solve the following difference equation :
 $(k + 1)x(k + 1) - x(k) = 0.$
where $x(k) = 0$ for $k < 0$ and $x(0) = 1.$
8. A coil has an inductance of L Henry and a resistance R_1 ohm. It is connected in series with a resistance R. The series circuit is driven by voltage $Vu(t)$. Obtain an expression for the voltage across the coil for $t > 0$. Hint: Apply Laplace transform.
9. Find the Fourier series of a train of pulses. Draw also its amplitude and phase spectra.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.