Course Code: 17B11EC513

Course Name: Course Credits: 04

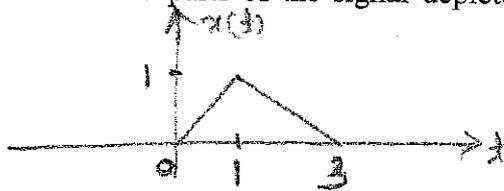**MAX. MARKS: 25**

MAX. TIME: 1.5 Hour

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Marks are indicated in square brackets against each question.

Q1. (a) Sketch the even and odd parts of the signal depicted in figure. Label and sketch carefully. **[2]** **[CO1, CO2]**

(b) Find the initial and final values, if they exist, of the signals with LT given below

(i) $F(s) = \frac{s+10}{s^2+3S+2}$ (ii) $F(s) = \frac{s^2+5s+7}{s^2+3s+2}$ **[2]**

(c) Write the h-parameters of the network in terms of z-parameters. **[1]**

Q2. (a) Write the properties of Hurwitz polynomial. **[2]** **[CO1, CO4]**

(b) Test the following polynomials for the Hurwitz property: **[3]**

(i) $P(s) = s^3 + 2s^2 + s + 2$ (ii) $P(s) = s^4 + 3s^2 + 4$

Q3. (a) Define Positive Real Function (PRF). **[1]** **[CO1, CO4]**

(b) Determine whether the following functions are PRF **[4]**

(i) $F(s) = \frac{s+3}{s^2+5s+1}$ (ii) $F(s) = \frac{5s^2+s}{s^2+1}$

Q4. (a) Write the properties of RL impedance or RC admittance. **[2]** **[CO1, CO4]**

(b) Synthesize the given network function in Cauer-I form. **[3]**

$$F(s) = \frac{(s+4)(s+6)}{(s+3)(s+5)}$$

Q5. (a) Synthesize the LC-driving point impedance **[2.5]** **[CO1, CO4]**

$$Z(s) = \frac{6s^4 + 42s^2 + 48}{s^5 + 18s^2 + 48s}$$

in Foster-II form.

(b) For given pole-zero diagram, that represents an RL impedance, synthesize in a series Foster form. **[2.5]**