**Code No. PC303EC**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY (An Autonomous Institution)**

**B.E. (ECE) III-Semester (AICTE) (Regular) Examination, Feb -2023**

**Subject: NETWORK THEORY**

**Time: 3 hours Max.Marks:60**

**Note: Missing data, if any, maybe suitably assumed.**

**PART-A**

**Answer All the questions.**

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| **Q.No.** | **Questions** | **Marks** | **CO** | **BTL** |
| **1. a** | A 2 port network has the following Z parameters. Z11 = 10 Ω, Z22 = 12 Ω,   Z12 = Z21 =5 Ω Compute the Y parameters.? | **2** | **1** | **L2** |
| **b** | Define hybrid parameters. | **2** | **1** | **L1** |
| **c** | Differentiate symmetrical and asymmetrical networks. | **2** | **2** | **L1** |
| **d** | Find the characteristic impedance of the following network. | **2** | **2** | **L3** |
| **e** | Explain band elimination filter. | **2** | **4** | **L2** |
| **f** | What is the criterion in choosing "m" value in m-derived filters? | **2** | **4** | **L2** |
| **g** | Mention the need for impedance matching networks. | **2** | **3** | **L1** |
| **h** | What is the rule to obtain an inverse network of a given network? | **2** | **3** | **L1** |
| **i** | Test whether the following polynomial is Hurwitz or not?  P(S) = S4 + S3 + 2S2 + 3S + 2 | **2** | **5** | **L3** |
| **j** | What do you mean by network synthesis? | **2** | **5** | **L2** |

**PTO**

**PART-B**

**Answer Any Five questions**.

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| **Q.No.** |  | **Questions** | **Marks** | **CO** | **BTL** |
| **2.** | **a** | Derive the necessary relations to obtain Z Parameters from Y Parameters. | **4** | **1** | **L3** |
| **b** | Obtain the condition for reciprocity AD-BC=1 for a 2 port network. | **4** | **1** | **L4** |
| **3.** | **a** | Derive an expression for characteristic impedance of a symmetrical T network. | **4** | **2** | **L3** |
| **b** | State and explain Image impedance and Iterative impedance of asymmetrical network. | **4** | **2** | **L2** |
| **4.** |  | Design a composite high pass filter to operate into a load of 600 Ω and have a cut off frequency of 1.2 KHz. The filter is to have one constant K-Section, one m-derived section with f∞ = 1.1 KHz and two terminating half sections with m = 0.6. | **8** | **4** | **L4** |
|  |  |  |  |  |
| **5.** | **a** | Design a bridged T attenuator with design impedance of 300 Ohm and attenuation of 20 dB. | **4** | **3** | **L3** |
| **b** | Explain constant resistance equalizers. | **4** | **3** | **L2** |
| **6.** | **a** | Synthesize the following function using Cauer form 1.  Z(S) = [ 4 ( S2 + 1 ) ( S2 + 9 ) ] / [ S ( S2 + 4 ) ] | **4** | **5** | **L4** |
| **b** | What are positive real functions? Explain its properties. | **4** | **5** | **L2** |
| **7.** | **a** | Compute the Z Parameters from the given network. | **4** | **1** | **L3** |
| **b** | Obtain an expression for Iterative impedance Zt1 of asymmetrical L network. | **4** | **2** | **L3** |
| **8.** | **a** | Describe the different types of filters classified on the basis of their frequency characteristics. | **4** | **3** | **L2** |
| **b** | Derive the necessary relations to design a symmetrical π attenuator. | **4** | **4** | **L3** |
| **9.** | **a** | Explain how a network function is Synthesize using Cauer first form. | **4** | **5** | **L2** |
| **b** | Show that the transmission Parameters are useful in describing networks which are connected in cascade. | **4** | **1** | **L3** |

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