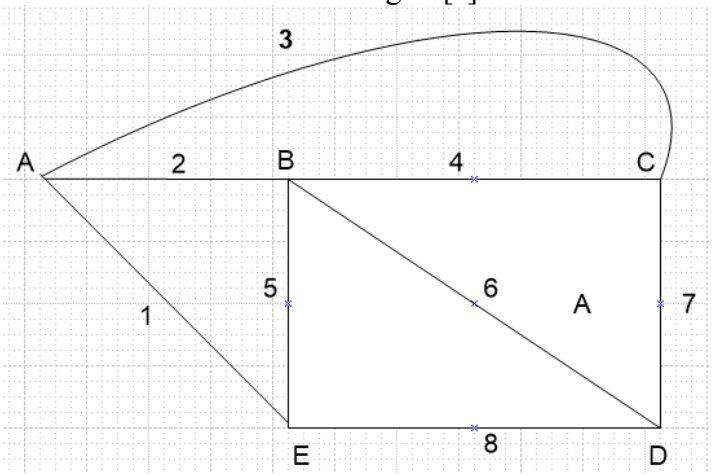
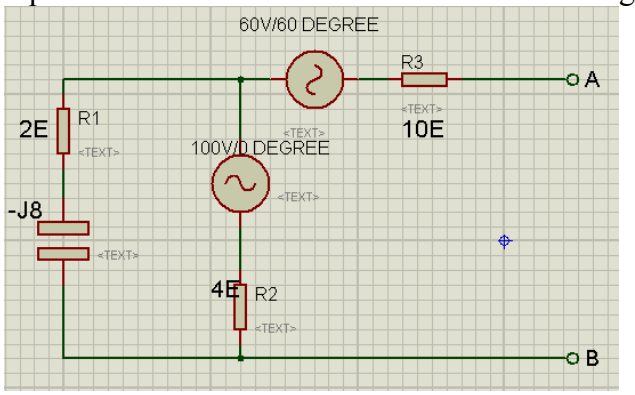
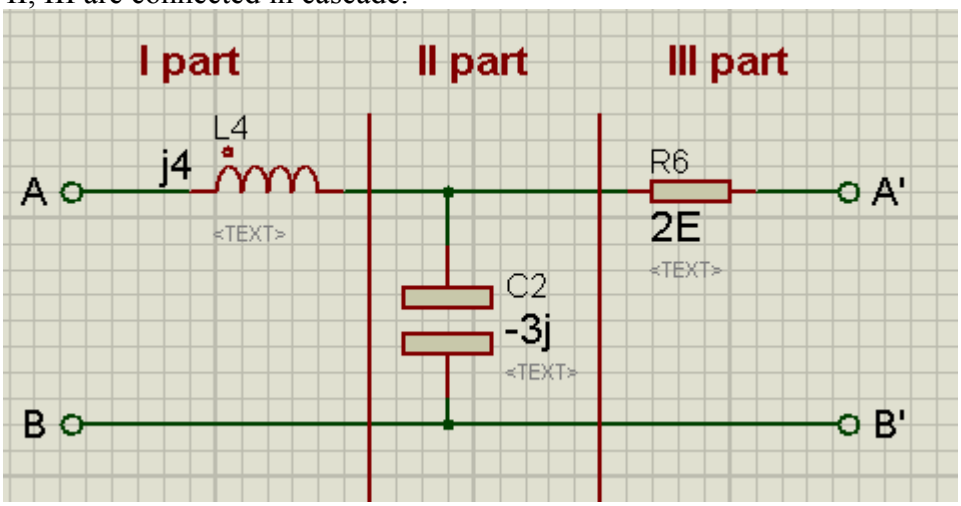
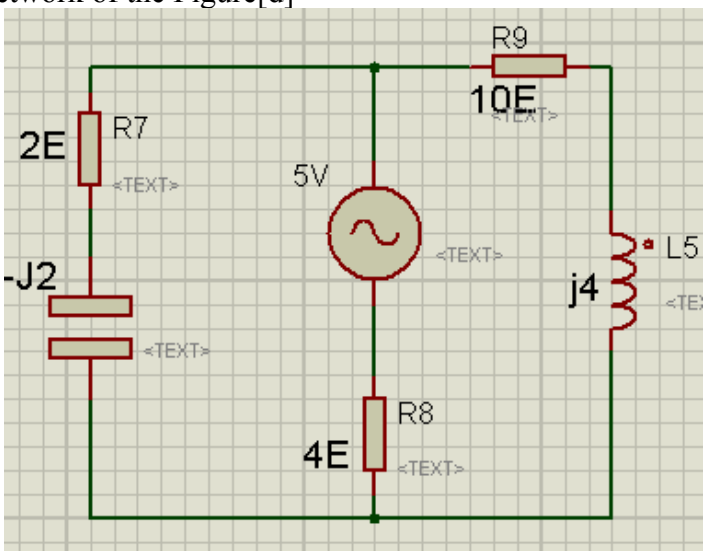
# UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

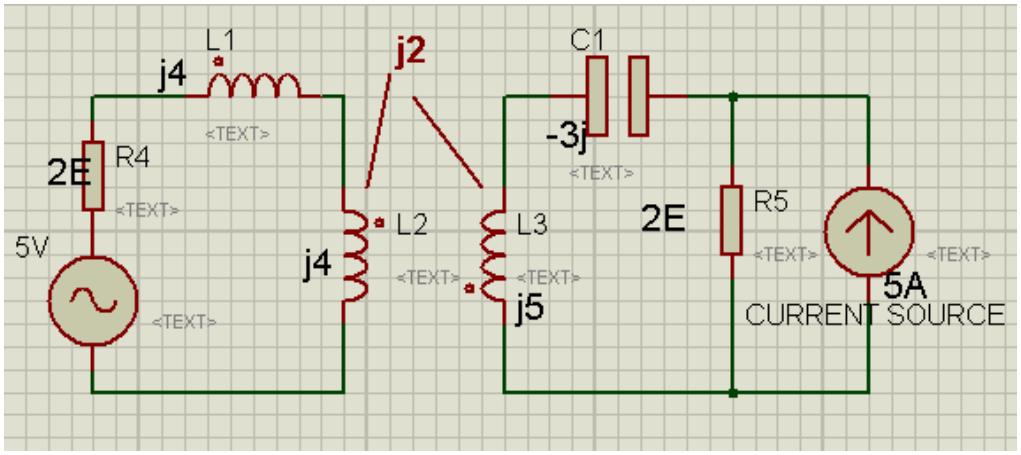
**End Semester Examination, December 2017**

**Program: B.Tech(EE/BCT/IoT)** | **Semester – III**
**Subject (Course): Network theory** | **Max. Marks : 100**
**Course Code : ELEG 204** | **Duration : 3 Hrs**
**No. of page/s: 3**

**Attempt all questions.**

| | SECTION A | Marks[20] | |
|---|---|---|---|
| 1. | Determine the possible number of trees from figure[a]<br>  <br><br>figure[a] | [5] | CO3 |
| 2. | Differentiate between tree and co-tree. | [5] | CO3 |
| 3. | Find the Thevenin's equivalent circuit at terminals AB of the circuit given in Figure[b]<br>  <br><br>figure[b] | [5] | CO1 |
| 4. | Draw the equivalent circuit of a two-port network in terms of ABCD parameters. Also, derive the formula convert ABCD parameters in terms of h parameters. | [5] | CO1 |

| | | | |
|---|---|---|---|
| | **SECTION B** | **Marks[40]** | |
| 5. | Determine transmission parameters of a T network shown in figure [c] considering three parts I, II, III are connected in cascade.<br>  <br><br>Figure[c] | **[10]** | **CO2** |
| 6. | Draw the Dual network of the Figure[d]<br>  <br><br>Figure[d] | **[10]** | **CO4** |
| 7. | Draw The Pole Zero diagram of given transfer function. Also find the time domain response of system using Pole-Zero diagram method and also verify it alternatively using residue method<br>$H(s)=\frac{2s}{(s^2+4s+8)}$ | **[10]** | **CO3** |
| 8. | Synthesize the given impedance function in Foster I and Foster II form<br>$\frac{8(s^2+4)(s^2+25)}{s(s^2+16)}$ | **[5+5]** | **CO4** |

| | SECTION C | Marks[40] | |
|---|---|---|---|
| 9. | Design the f-loop matrix and f-loop equations, for the network shown in figure [e].<br>  <br><br>Figure[e] | [20] | CO3 |
| 10. | Synthesize the given function F(s)= $\frac{3(s+2)(s+4)}{s(s+3)}$ in a **foster Form I&II** and a **Cauer Form I&II** , if<br>(a) F(s) is an impedance function<br>(b) F(s) is an admittance function | [20] | CO4 |

**Roll No: ----------**

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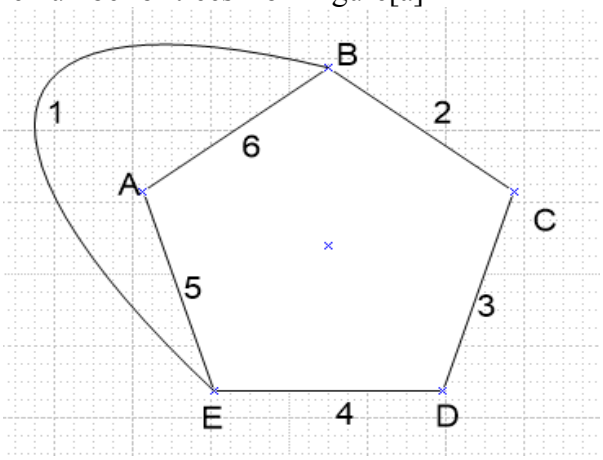
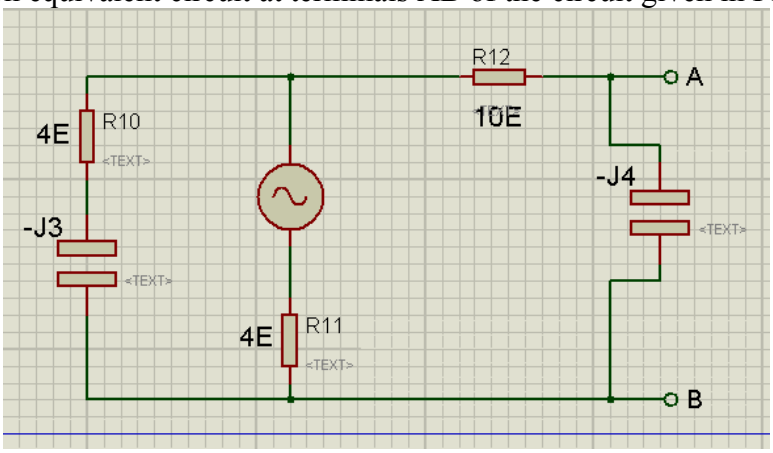
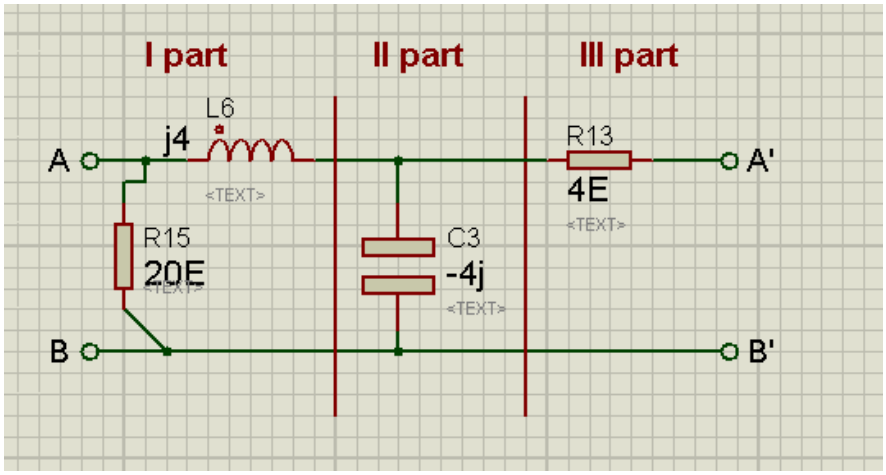
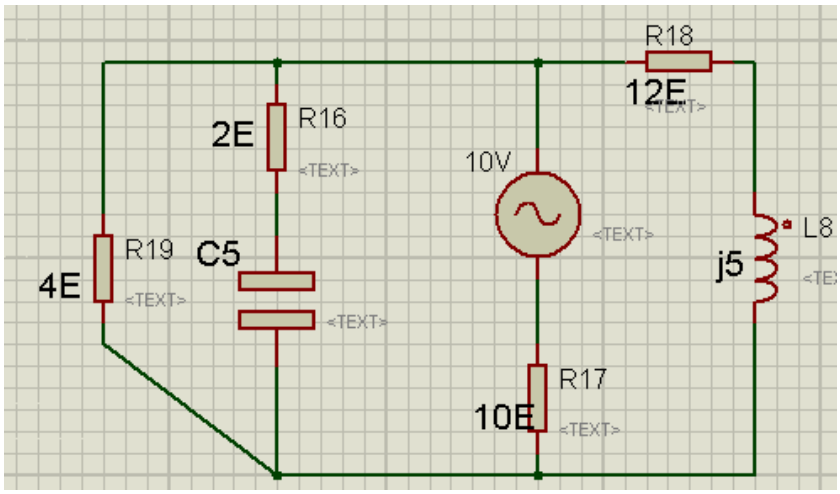
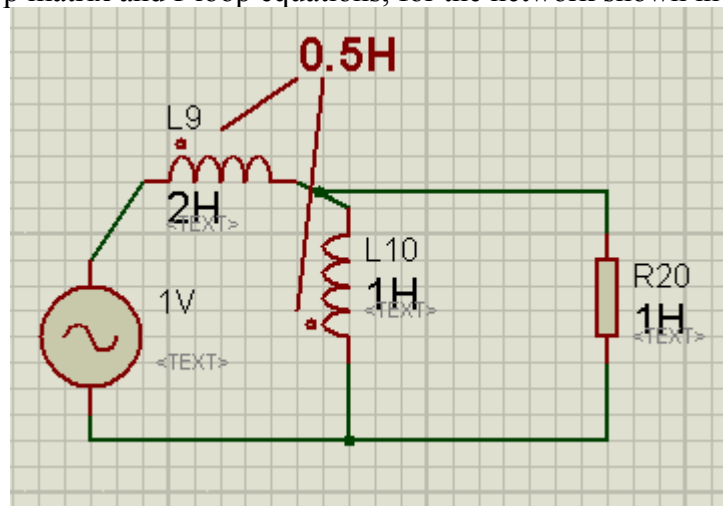
| 1. | Determine the possible number of trees from figure[a]<br>  <br><br>figure[a] | [5] | CO3 |
| 2. | Differentiate between twigs and links. | [5] | CO3 |
| 3. | Find the Norton equivalent circuit at terminals AB of the circuit given in Figure[b]<br>  <br><br>figure[b] | [5] | CO1 |

| | | | |
|---|---|---|---|
| 4. | Draw the equivalent circuit of a two-port network in terms of Z parameters. Also, derive the formula convert Z parameters in terms of Y parameters. | **[5]** | **CO1** |
| | **SECTION B** | **Marks[40]** | |
| 5. | Determine transmission parameters of a T network shown in figure [c] considering three parts I, II, III are connected in cascade.<br>  <br><br>Figure[c] | **[10]** | **CO2** |
| 6. | Draw the Dual network of the Figure[d]. also discuss the properties to form the dual graph.<br>  <br><br>Figure[d] | **[10]** | **CO4** |
| 7. | Draw The Pole Zero diagram of given transfer function. Also find the time domain response of system using Pole-Zero diagram method and also verify it alternatively using residue method<br>$H(s)=\frac{s^2+4s+3}{(s^2+2s)}$ | **[10]** | **CO3** |
| 8. | Synthesize the given impedance function in Foster I and Cauer I form | **[5+5]** | **CO4** |

| | | | |
|---|---|---|---|
| | $\frac{2(s^2+1)(s^2+9)}{s(s^2+4)}$ | | |
| | **SECTION C** | **Marks[40]** | |
| 9. | Design the f-loop matrix and f-loop equations, for the network shown in figure [e]<br>  <br><br>Figure[e] | **[20]** | **CO3** |
| 10. | Explore the R-L representation of (a) Foster I and II (b) Cauer I and II for an impedance function, given by F(s)= $\frac{s(s+2)(s+5)}{(s+1)(s+4)}$ | **[20]** | **CO4** |