**20EI304**

**Hall Ticket Number:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **II/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **March, 2022** | **Electronics and Instrumentation Engineering** | | |
| **Third Semester** | **Network Theory** | | |
| **Time:** Three Hours | | **Maximum: 7**0 Marks | |
| *Answer Question No.1 compulsorily.* | | | (14X1 = 14 Marks) |
| *Answer ONE question from each unit.* | | | (4X14=56 Marks) |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Answer all questions | | | | **COS** | | **BT** | **Marks** |
| 1. | a) | | Define Kirchhoff’s current and Voltage laws | CO1 | |  |  |
|  | b) | | Differentiate between series and parallel connection of resistors | CO1 | |  |  |
|  | c) | | Define node , mesh and super node | CO1 | |  |  |
|  | d) | | State current division and voltage division rule | CO2 | |  |  |
|  | e) | | State Super Position Theorem | CO2 | |  |  |
|  | f) | | Define source transformation. | CO2 | |  |  |
|  | g) | | Differentiate steady state and transient response | CO3 | |  |  |
|  | h) | | Define time constant of a RL and RC circuits. | CO3 | |  |  |
|  | i) | | What are the three cases involved in R-L-C transients | CO3 | |  |  |
|  | j) | | What is expression for resonance frequency of an RLC parallel circuit? | CO3 | |  |  |
|  | k) | | A series RLC circuit has R=10Ω, XC=20 Ω and XL=20 Ω is excited by a sinusoidal source of voltage 200v.What will the Q factor and voltage across the coil. | CO4 | |  |  |
|  | l) | | What is the expression for Laplace transform of the periodic function | CO4 | |  |  |
|  | m) | | Find the Laplace Transform of unit step and ramp functions | CO4 | |  |  |
|  | n) | | Draw the equivalent circuit of the two-port network governed by open-circuit impedance parameters. | CO4 | |  |  |
| **UNIT - I** | | | | | | | |
| 2. | a) | Determine current delivered by the 30v source in the circuit shown in fig1.Also find current flowing through R1 resistor    fig 1 fig 2 | | CO1 |  | | 7M |
|  | b) | For the circuit shown in fig2. find the power supplied by the source and I using mesh analysis.Also find the node voltages. | | CO1 |  | | 7M |
| **(OR)** | | | | | | | |
| 3. | a) | For the circuit shown in fig3. find the node voltages and also find the voltage across the each resistor.  fig3 | | CO1 |  | | 7M |
|  | b) | Discuss how a star connected network can be transformed into a delta connected circuit and vice versa. | | CO1 |  | | 7M |
| **UNIT - II** | | | | | | | |
| 4. | a) | State and Explain Thevenin’s theorem.Find the Norton’s equivalent circuit for the network shown in fig4. Also find the cuurrent fliowing through 10 ohm resistor.  C:\Users\Niranjan\Desktop\SET 3 NT\New Doc 2019-10-05 17.06.47_6.jpg  Fig4 fig 5 | | CO2 |  | | 7M |
| **P.T.O.**  **20EI304** | | | | | | | |
|  |  |  | |  |  | |  |
|  | b) | For the circuit shown in fig5. , determine the maximum power delivered to the 5ohm resistor. | | CO2 |  | | 7M |
| **(OR)** | | | | | | | |
| 5. | a) | For the circuit circuit shown in fig6 ,determine the true power ,reactive power and apparent power in each branch. What is the power factor of the total circuit  C:\Users\Niranjan\Desktop\SET2 NT\New Doc 2019-10-05 16.46.54_6.jpgC:\Users\Niranjan\Desktop\SET 3 NT\New Doc 2019-10-05 17.06.47_4.jpg  Fig6 fig7 | | CO2 |  | | 7M |
|  | b) | Define average value and RMS value of the wave form. Find the average value and RMS value of the given wave form shown in the fig7. | | CO2 |  | | 7M |
| **UNIT - III** | | | | | | | |
| 6. | a) | For a RLC series resonance circuit derive the expressions for f0 , f1, f2, BW and Q factor. | | CO3 |  | | 8M |
|  | b) | For a given tank circuit shown in fig8. derive the expression for the resonance frequency f0 . If RL=10Ω , L= 0.1H and C=10µ farads , find f0  fig8 E:\SET1 NT\New Doc 2019-10-05 16.59.09_8.jpgfig 9 | | CO3 |  | | 6M |
| **(OR)** | | | | | | | |
| 7. | a) | Analyze DC response of the RL and RC circuits | | CO3 |  | | 8M |
|  | b) | In the circuit shown in fig9 the switch in closed at time t=0. Obtain the expression for the current at any time if R1=R2=100Ω , L=0.1H &V =10v | | CO3 |  | | 6M |
| **UNIT - IV** | | | | | | | |
| 8. | a) | i) Find the Laplace Transform of the given functions  f1 ( t ) = ( t + 2 )2 et and  ii) Find the Inverse Laplace Transform of | | CO4 |  | | 8M |
|  | b) | State and prove initial value and final value theorems and time differentiation theorem. | | CO4 |  | | 6M |
| **(OR)** | | | | | | | |
| 9. | a) | Explain Z and Y parameters of two port network | | CO4 |  | | 4M |
|  | b) | Find the Z and Y parameters of the given two port networks shown in fig10 and fig11.  C:\Users\Niranjan\Desktop\SET2 NT\New Doc 2019-10-05 16.46.54_11.jpg  Fig10 fig11 | | CO4 |  | | 10M |

****