**20EE302**

**Hall Ticket Number:**

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| **II/IV B.Tech (Regular / Supplementary) DEGREE EXAMINATION** | | | |
| **February, 2023** | **Electrical and Electronics Engineering** | | |
| **Third Semester** | **Network Analysis** | | |
| **Time:** Three Hours | | **Maximum:7**0 Marks | |
| *Answer Question No.1 compulsorily.* | | | (14X1 = 14 Marks) |
| *Answer ONE question from each unit.* | | | (4X14=56 Marks) |
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| 1. | a) | | | Define time constant of a network. | CO1 | L1 |  |
|  | b) | | | Find Laplace transform of e-at . | CO1 | L3 |  |
|  | c) | | | State the final value theorem. | CO1 | L1 |  |
|  | d) | | | Write the relation between line and phase current of a 3-phase delta system. | CO2 | L1 |  |
|  | e) | | | Write the power equation of 3 ϕ systems using 2- wattmeter method. | CO2 | L2 |  |
|  | f) | | | Write the equations for star to delta conversion. | CO2 | L2 |  |
|  | g) | | | Draw Z-parameter model of a 2-port network. | CO3 | L3 |  |
|  | h) | | | Define pole and zero of a network. | CO3 | L1 |  |
|  | i) | | | Define transmission parameters. | CO3 | L1 |  |
|  | j) | | | ABCD parameters of two port networks are A1 , B1, C1, D1 and A2 , B2, C2, D2 What are the transmission parameters if the networks are cascaded? | CO3 | L3 |  |
|  | k) | | | Write the design equations of a Constant –K Band Pass filter. | CO4 | L1 |  |
|  | l) | | | Define band reject filter. | CO4 | L1 |  |
|  | m) | | | Define coefficient of coupling. | CO4 | L1 |  |
|  | n) | | | Draw m-derived low pass filter. | CO4 | L3 |  |
|  | | **Unit - I** | | | | | |
| 2. | a) | | Explain the Laplace transform method of finding response of a RLC circuit. | | CO1 | L3 | 7M |
|  | b) | | In the figure shown below after the steady state condition is reached , at time t=0 the switch K is suddenly opened. Find the value of the current through the inductor at time t = 0.5 seconds. | | CO1 | L4 | 7M |
|  | | **(OR)** | | | | | |
| 3. | a) | | A series RL circuit has R= 25 Ω and L = 5 Henry. A dc voltage V of 100 V is applied to this circuit at t = 0 secs. Find : (a) The equations for the charging current , and voltage across R & L (b) The current in the circuit 0.5 secs after the voltage is applied. (c) The time at which the drops across R and L are equal. | | CO1 | L4 | 7M |
|  | b) | | Derive the expression for current i(t), voltage across the inductance for DC transient in series RL circuit. | | CO1 | L3 | 7M |
|  | | **Unit – II** | | | | | |
| 4. | a) | | What are the advantages of poly-phase system over single phase system? | | CO2 | L2 | 7M |
|  | b) | | Derive the relation between line and phase voltages in a star connected system. | | CO2 | L3 | 7M |
|  | | **(OR)** | | | | | |
| 5. | a) | | A 3 phase star connected RYB system with an effective voltage 400v, has a balanced load with impedances of (4+j3)Ω. Calculate the phase, line currents and power in each phase. | | CO2 | L3 | 7M |
|  | b) | | Explain the procedure of measuring 3phase power using 2-wattmeter method. And derive the necessary equation describing the power measurement. | | CO2 | L3 | 7M |
|  | | **P.T.O**  **20EE302**  **Unit - III** | | | | | |
| 6. | a) | | What are the restrictions on pole and zero locations for driving point functions and transfer functions? | | CO3 | L2 | 7M |
|  | b) | | Explain about transformation of R, L and C elements and draw the transformed circuits for both L, C elements in impedance form, admittance form. | | CO3 | L2 | 7M |
|  | | **(OR)** | | | | | |
| 7. | a) | | The Z-parameters of a two port network are Z11=15, Z22=24, Z12=Z21=6.  Determine  i. ABCD parameters and  ii. Equivalent T network. | | CO3 | L4 | 7M |
|  | b) | | Draw the pole zero diagram for the given network function V(s)=4s(s+2)/(s+1)(s+3) and  hence obtain V(t). | | CO3 | L4 | 7M |
|  | | **Unit - IV** | | | | | |
| 8. | a) | | Explain the classification of filters. | | CO4 | L2 | 7M |
|  | b) | | Derive the design equations for high pass filter. | | CO4 | L3 | 7M |
|  | | **(OR)** | | | | | |
| 9. | a) | | For the circuit in Fig below, determine the coupling coefficient and the energy stored in the coupled inductors at t = 1.5 s. | | CO4 | L4 | 7M |
|  | b) | | Explain about DOT convention and derive expressions for equivalent inductance of series connection and parallel connection of coupled circuits. | | CO4 | L1 | 7M |

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