B.Tech I Year II Semester (R15) Regular & Supplementary Examinations May 2018

**NETWORK ANALYSIS**

(Common to ECE & EIE)

Time: 3 hours Max. Marks: 70

**PART - A**

(Compulsory Question)

*****

1 Answer the following: (10 X 02 = 20 Marks)

(a) Give the properties of Miller and Tellegen's theorem.

(b) Define time constant of RL circuit.

(c) Define tree and co-tree.

(d) Explain maximum power transfer theorem.

(e) Write the limitations of super position theorem.

(f) Define quality factor and sensitivity of a series RLC circuit.

(g) What are the advantages of state variable analysis?

(h) What do you mean by external critical frequency?

(i) Define Neper.

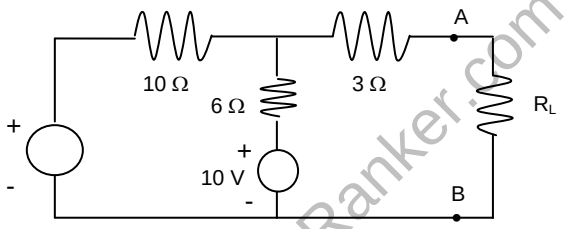
(j) Write the applications of different types of filter.

**PART - B**

(Answer all five units, 5 X 10 = 50 Marks)

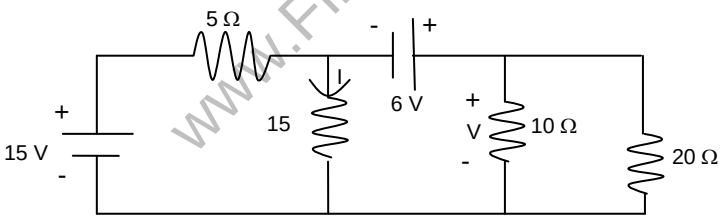
**UNIT - I**

2 Obtain the Thevenin's equivalent of the network shown in figure below. Then draw the Norton's equivalent network by source transformation.




**OR**

3 Find V and I using mesh analysis.

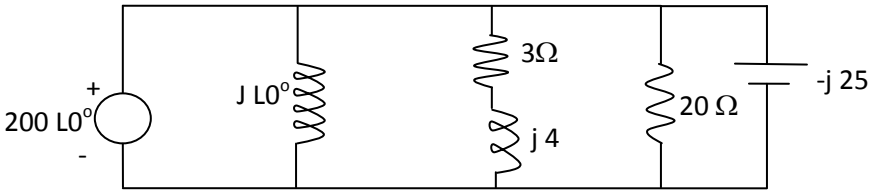



**UNIT - II**

4 A series RLC circuit with R = 300 ohms, L = 1H and C = 100μF has a constant voltage of 50 V applied to it at t = 0. Find the maximum current value. Assume zero initial conditions.

**OR**

5 Obtain the total current, branch currents and the power consumed by each branch. Draw the phasor diagram for the network shown in figure given below.

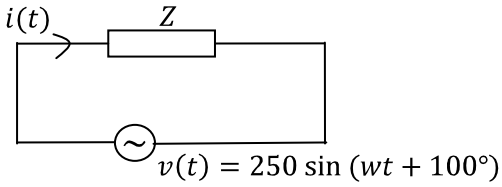



Contd. in page 2

**Code: 15A04201** **R15**

**UNIT - III**

6 For the circuit shown in the figure below, a voltage $v(t)$ is applied and the resulting current in the circuit $i(t) = 15\sin(wt + 30°)\,A$. Determine the active power, reactive power, power factor and the apparent power.




**OR**

7 (a) What is the relation between bandwidth and resonant frequency?

(b) An inductance of 0.5H a resistance of 5 Ω and a capacitance of 8 μF are in series across a 220 V AC supply. Calculate the frequency at which the circuit resonates. Find the current at resonance bandwidth, half power frequencies and the voltage across capacitance of resonance.

**UNIT - IV**

8 (a) Define self-inductance of a coil, mutual inductance between two coils and coefficient of coupling.

(b) Define the relation between self, mutual inductance and coefficient of coupling.

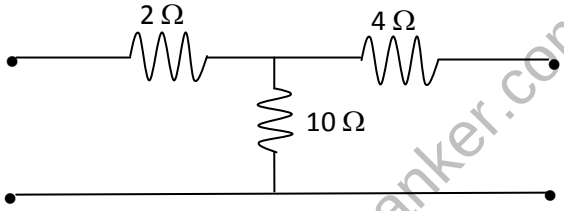
**OR**

9 (a) Distinguish between reactance, impedance, admittance and susceptance.

(b) Explain image parameters in two port network.

**UNIT - V**

10 Find the h-parameters for the network shown in figure below.




**OR**

11 Design a constant-K low pass filter, both t and π sections having a cut-off frequency of 2 kHz to operate with a terminated load resistance of 500 Ω

*****