

B.Sc. Semester I (Honours) Examination-2021
Subject: Electronic Science
Paper: CC-I (Basic Circuit Theory and Network Analysis)

Time: 2 Hours

Full Marks: 40

Answer any **EIGHT** questions.

5X8=40

1. Distinguish between ideal voltage source and ideal current source. Two capacitors C_1 and C_2 are connected in series. Calculate the equivalent capacitance from first principle.
2. Distinguish between self induction and mutual induction. Calculate the energy stored in a coil connected in an electrical circuit carrying a current i .
3. Draw a typical star network of three resistors R_1 , R_2 and R_3 . Find its equivalent delta network.
4. State and explain KCL and KVL of network analysis. What are mesh and node analysis?
5. A capacitor C in uncharged condition is joined to a dc voltage source E through a resistor R at time $t=0$. Find the voltage across the capacitor as a function of time $v_C(t)$ for $t>0$. What is time constant of the circuit?
6. Define instantaneous, peak, rms and average values of a sinusoidal voltage written in conventional notations. Give their mathematical notations. What is complex impedance of a series LCR ac circuit?
7. What do you mean by instantaneous power and average power of an ac circuit? Define power factor. Find the power factor of a series circuit of L and R connected with an ac source $A \sin \omega t$.
8. Study the frequency response of parallel LCR ac circuit. Define bandwidth and quality factor of the circuit.
9. State and prove superposition theorem and maximum power transfer theorem.
10. Write notes on any two of the following:
(a) Electrolytic capacitor, (b) Variable inductors, (c) Impedance parameters.