

25/5/24



End Semester Examination 2024
Department of Computer Science, School of Technology
DOON UNIVERSITY, DEHRADUN
B.Tech. (Computer Science),
Course: PHG153, Electrical Circuit Analysis

Time allowed – 2 hours

Max.Marks-30

General Instructions

- This question paper contains three sections A, B, and C.
- Section A contains 5 question 2 mark each
- Section B Contains 4 question 3 mark each
- Section C contains 2 question 4 mark each.
- Attempt all question.

Section A

5 x 2 = 10

1. Define a two-port network and provide one example of where it is used?
2. A power source with a Thevenin equivalent resistance of 10 ohms is connected to a load resistor. What value should the load resistor have to achieve maximum power transfer?
3. Derive the expression for the power delivered to the load in a circuit with a source having an internal resistance R_s and the load resistance R_L .
4. Calculate the total impedance of a series RC circuit with $R=10$ ohms and $C=100\mu F$ when connected to a 50 Hz AC source.
5. Explain Tellegen's Theorem and illustrate its application

Section B

4 x 3 = 12

6. Determine the current in a series RC circuit with $R=5$ ohms and $C=50\mu F$ connected to an AC source with a peak voltage of 20V and frequency of 60 Hz.
7. In a series RLC circuit with $R=5$ ohms, $L=0.2$ H, and $C=50 \mu F$, determine the quality factor Q and the bandwidth.
8. Write the comparison between Series and Parallel Resonance
9. Define the following terms for an A.C. signal:

(1) Peak Value	(2) Average Value
(3) R.M.S value	(4) Power factor

Section C

2 x 4 = 8

10. An alternating e.m.f. $E = E_0 e^{j\omega t}$ is applied to a circuit having resistance R, inductance L and capacitance C in series. Find the expression for the current in the circuit. Discuss the condition under which the current and applied voltage are in same phase.

11. An alternating potential of 50 volts (r.m.s.) at 50 c/s is applied to a circuit having a resistance of 5 ohms, an inductance of 80 mH and a capacitor of 100 μ F connected in series. Calculate
- (i) The impedance of the circuit
 - (ii) The voltage drops across each element of the circuit
 - (iii) The current at resonance

Or

12. Describe the different parameters used to characterize a two-port network and provide the equations relating the input and output variables for each set of parameters.