

**1903000202030092**  
**EXAMINATION FEBRUARY-MARCH 2024**  
**BACHELOR OF SCIENCE (SECOND SEMESTER)**  
**ELECTRONICS PAPER – II**  
**NETWORK ANALYSIS & FILTERS**

[Time: As Per Schedule]

[Max. Marks: 50]

**Instructions:**

**1. Fill up strictly the following details on your answer book**

- a. Name of the Examination : **BACHELOR OF SCIENCE (SECOND SEMESTER)**
- b. Name of the Subject : **ELECTRONICS PAPER – II NETWORK ANALYSIS & FILTERS**
- c. Subject Code No : **1903000202030092**

2. Sketch neat and labelled diagram wherever necessary.
3. Figures to the right indicate full marks of the question.
4. All questions are compulsory.

Seat No:

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Student's Signature

**Q.1 Answer in Short**

**8**

- a) Define: Resonance
- b) What do you mean by Quality factor (Q)?
- c) What is filter?
- d) Find the Laplace transform of  $f(t)=t$ .

**Q.2**

- a) What is series resonance and find the expression for resonance frequency, bandwidth & Q factor? **10**
- b) A series resonance circuit uses an inductor of  $10\mu\text{H}$  and if the resonance frequency is  $1\text{KHz}$  then find the value of the capacitor used in the circuit. **4**

**OR**

- a) Discuss fully step current response of a circuit containing the series combination of resistance and inductance (RL) **10**
- b) A series RL-circuit subjected to step response having  $R = 10\text{k}\Omega$  and  $L = 2.5\text{ H}$ . Find the time constant of RL-circuit. **4**

- Q.3**
- a) Derive the Fourier constants  $a_0, a_1, b_0, b_1$ . **10**
  - b) Derive the Laplace transform of Parabolic function **4**

**OR**

- a) Derive the Laplace transform for the  $n^{\text{th}}$  order derivative. **10**
- b) Derive the Laplace transform of Ramp function **4**

- Q.4 Write Notes (Any Two) **14****

- a) Parallel Resonance
- b) Types of Filters
- c) Inverse Laplace transform.
- d) Band pass filter

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