*R25 Regulation* *Subject code:5ES2AK*

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

**(Autonomous, Accredited by NAAC with 'A+' Grade)**

## B.Tech II Semester Regular Examinations, June 2026

## ELECTRICAL CIRCUITS – II

*(EEE)*

*Maximum Marks: 60* Date:22.06.2026 Duration: 3 hours

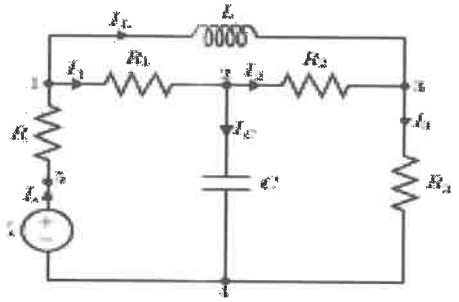
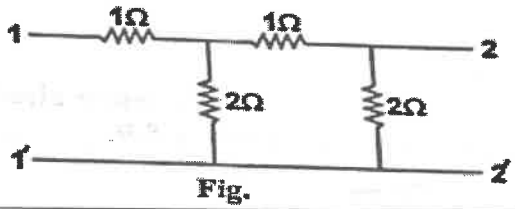
**Note:** **1.This question paper contains two parts A and B.**
**2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.**
**3. Part B consists of 5 Units. Answer any one full question from each unit.**
**4. Each question carries 10 marks and may have a, b, c, d as sub questions.**

Part-A

| All the following questions carry equal marks (5X2M=10Marks) | | Marks | CO | BTL |
|---|---|---|---|---|
| 1.a | Explain the significance of initial conditions in inductors and capacitors. | 2M | 1 | L1 |
| b | State the Laplace Transform of unit impulse and unit ramp functions. | 2M | 2 | L1 |
| c | What is an incidence matrix? Mention its properties. | 2M | 3 | L1 |
| d | State the conditions for reciprocity and symmetry in two-port networks. | 2M | 4 | L1 |
| e | Define pass band and stop band of a filter. | 2M | 5 | L1 |

Part-B

| Answer All the following questions. (5X10M=50Marks) | | Marks | CO | BTL |
|---|---|---|---|---|
| 2 | Derive the transient response of a series RL circuit excited by a DC source using integro-differential equations. | 10M | 1 | L2 |
| | OR | | | |
| 3 | A series RC circuit having R = 20 Ω and C = 50 μF is connected to a 200 V DC supply. Determine the charging current and capacitor voltage equations. | 10M | 1 | L2 |
| 4 | Derive the transient response of a series RC circuit using Laplace Transform method for DC excitation. | 10M | 2 | L3 |
| | OR | | | |
| 5 | A series RL circuit with R = 5 Ω and L = 2 H is connected to a 50 V DC source. Obtain the current response using Laplace Transform approach. | 10M | 2 | L3 |
| 6 | Explain the formation of Tree and its applications in network analysis. | 10M | 3 | L2 |
| | OR | | | |
| 7 | Determine the cut-set matrix for a given electrical network graph. | 10M | 3 | L2 |

| | | | | |
|---|---|---|---|---|
| |  | | | |
| 8 | Derive transmission (ABCD) parameters of a two-port network. | 10M | 4 | L2 |
| | OR | | | |
| 9 | a) Compare impedance parameters and admittance parameters<br>b) Determine impedance parameters for the fig below.<br><br><br>Fig. | 5M<br>5M | 4 | L3 |
| 10 | Discuss about Elementary treatment of Constant-k and M-derived filters. | 10M | 5 | L2 |
| | OR | | | |
| 11 | Design a constant-k low pass filter with cut-off frequency 2 kHz and load resistance 600 Ω. | 10M | 5 | L2 |