



R17 Regulation

Subject code: 1P3DE

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech II Year I Semester Supplementary Examinations, February 2024

NETWORK ANALYSIS

(ECE)

Maximum Marks: 70

Date: 26.02.2024 Duration: 3 hours

- Note:**
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 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

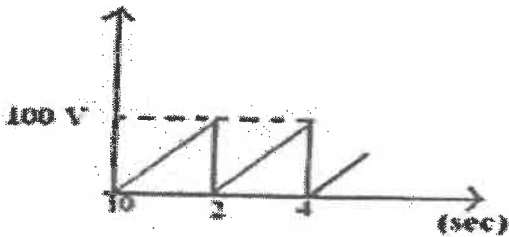
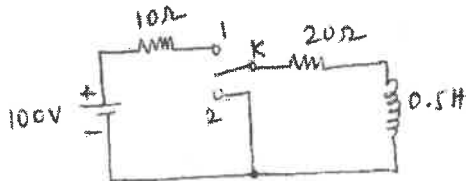
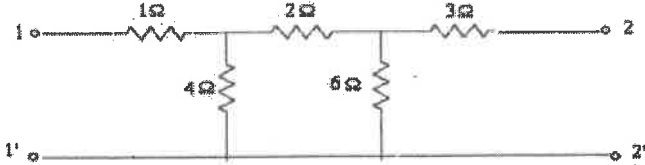
All the following questions carry equal marks (10X2M=20 Marks)

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|----|--|
| 1 | Define Coefficient of coupling and find the Coefficient of coupling for two coils having $L_1=2$ H, $L_2=8$ H and $M=3$ H? |
| 2 | Derive the equivalent inductance for two coils are connected in series (aiding and opposing). |
| 3 | What is Q-factor? |
| 4 | What is the power factor in the series R-L-C circuit at resonance? What is the reason for that? |
| 5 | List any three properties of Laplace transform |
| 6 | Define the following terms related to periodic function (i) RMS Value (ii) Average value |
| 7 | A two-port network is described by $V_1=I_1+2V_2$ and $I_2=-2I_1+0.4V_2$. Find the Impedance matrix? |
| 8 | Define Port and Two-port network |
| 9 | List the properties of Low pass filter |
| 10 | Draw constant-k low pass filter (proto type). |

Part-B

Answer All the following questions. (5X10M=50Marks)

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|----|---|
| 11 | Define Graph, Tree, Basic tie set matrix and cutset matrix for a planner network with an example. [10] |
| OR | |
| 12 | A voltage $200\sin\omega t$ v is applied to a series RLC circuit where $R=60\Omega$, $L=0.18$ mH and $C=20\mu$ F. Find: a) The power supplied by the source b) The reactive power supplied by the source c) The reactive power of the capacitor d) The reactive power of the inductor and e) The power factor of the circuit. [10] |
| 13 | Deduce the transient response of RL series circuit excited by DC source. [10] |
| OR | |
| 14 | In a series RLC circuit, $R = 5 \Omega$, $L = 1$ H and $C = 1$ F. A dc voltage of 20 V is applied at $t = 0$. Obtain $i(t)$. [10] |
| 15 | a) Derive expression for RMS value and Average value of $V_m\sin\omega t$. [5] |

	b) Calculate the rms value , Average value, Form factor and Peak factor of sawtooth waveform shown in figure below. [5] 
	OR
16	A circuit shown in figure below the switch K is kept first at position 1 and steady state condition is reached. At $t=0$ the switch is moved to position 2. Find the current value in both the cases using Laplace transform. [10] 
17	Derive the relation between ABCD and 'Z'-parameters. [10]
	OR
18	Obtain 'Z' – parameters for the given network shown below. [10] 
19	Design a high pass filter with a cut-off frequency of 2.5 KHz with a terminated design impedance of 1000 Ω. [10]
	OR
20	Design and m-derived π -section high pass filter having a cutoff frequency of a 2 kHz. Take $R_k=600\Omega$ and $f=2.1$ kHz. Find the attenuation at $f = 2.05$ KHz and 25k Hz. [10]