



R22 Regulation

Subject code:4E1AI

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech I Semester Supplementary Examinations, July 2025

FUNDAMENTALS OF ELECTRICAL ENGINEERING

(ECE)

Maximum Marks: 60

Date: 14.07.2025

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 (10X1M=10 Marks)		Marks	CO	BTL
1 a	State KVL & KCL.	1M	1	L1
b	Draw Thevenin's equivalent circuit and its source transformation network?	1M	1	L1
c	Define Peak Factor and Form Factor.	1M	2	L1
d	Write the relationship between voltages & currents in a 3-phase balanced star network?	1M	2	L1
e	Distinguish between auto transformer and single phase transformer?	1M	3	L1
f	List out the losses that occur in transformer?	1M	3	L1
g	Mention the applications of 3-phase induction motor?	1M	4	L1
h	What is the purpose of commutator?	1M	4	L1
i	What is the need of earthing?	1M	5	L1
j	Mention the purpose of Switch Fuse Unit.	1M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	a) Determine the equivalent resistance between X & Y.	5M	1	L2
		5M		
	b) State and explain Reciprocity theorem.	5M		
OR				
3	a) Derive the formulae for Star -Delta transformation.	5M	1	L2

	<p>b) Find i_0 in the circuit given below using Nodal analysis?</p>	5M		
4	<p>Determine the peak value, RMS value, average value, peak factor and form factor of Sinusoidal waveform?</p> <p style="text-align: center;">OR</p>	10M	2	L2
5	<p>Detail the steady state analysis of 1-phase series RC circuit with phasor diagram.</p>	10M	2	L2
6	<p>Explain the procedure to obtain the equivalent circuit parameters of a single-phase transformer by conducting OC & SC tests.</p> <p style="text-align: center;">OR</p>	10M	3	L2
7	<p>a) Explain the principle of operation of Transformer. b) Derive the equation of EMF for a single phase transformer.</p>	5M 5M	3	L2
8	<p>Explain the construction of DC machine in detail with neat diagram.</p> <p style="text-align: center;">OR</p>	10M	4	L2
9	<p>a) Derive the torque equation of DC motor. b) Explain torque speed characteristics of induction motor.</p>	5M 5M	4	L2
10	<p>a) Discuss the differences between MCB & Fuse. b) What are different types Wires & Cables?</p> <p style="text-align: center;">OR</p>	5M 5M	5	L2
11	<p>a) Explain about the classification of Batteries. b) Explain the operation of MCCB.</p>	5M 5M	5	L2