R22 Regulation *Subject code:4E1AI*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech I Semester Supplementary Examinations, June 2026

FUNDAMENTALS OF ELECTRICAL ENGINEERING

(ECE)

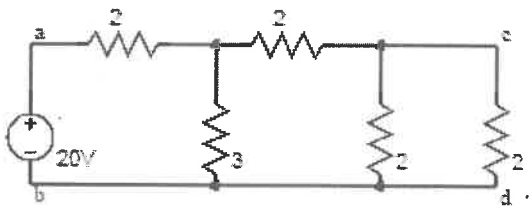
Maximum Marks: 60 Date: 20.06.2026 Duration: 3 hours

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	Classify the all the different types of voltage and current sources	1M	1	L1
b	State the Thevenins theorem and write its limitations	1M	1	L1
c	Define form factor and peak factor and also write their formulas	1M	2	L1
d	Draw the 3 phase balanced circuits, and write the voltage and current relations in star connection	1M	2	L1
e	Define auto transformer.	1M	3	L1
f	Define voltage regulation and efficiency in single phase transformer	1M	3	L1
g	Write induced E.M.F equation of D.C generator and back E.M.F equation of D.C Motor	1M	4	L1
h	What is slip and write the formula for percentage of slip in an 3 phase induction motor .	1M	4	L1
i	Define earthing?	1M	5	L1
j	Write the applications of D. C batteries.	1M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	a) Explain the nodal analysis procedure with suitable example. b) Distinguish between super position and reciprocity theorems	5M 5M	1	L2
	OR			
3	a) Find Equivalent resistance for the circuit (a-b) shown in Fig.	5M	1	L2
				
	b) Explain current division rule using suitable example.	5M		

4	a) Define the following terms i)sinusoidal voltage &currents ii) cycle and period iii)frequency iv) peak and instantaneous values b) Derive the average value of an alternating quantity for sine wave (either voltage or current	5M 5M	2	L2
	OR			
5	a) Explain Rectangular and polar representation. b) Explain the Analysis of single-phase ac circuits consisting of R and L	5M 5M	2	L2
6	a) Explain properties of ideal transformer b) Discuss the open circuit test and short circuit test on single phase transformer with neat diagrams.	5M 5M	3	L2
	OR			
7	a) Develop and derive the transformer equivalent circuit referred to primary and also discuss the regulation and efficiency. b) Draw the phasor diagram of a single-phase transformer on no load and explain it.	5M 5M	3	L2
8	a) Explain the construction of dc machines and working principle operation of D.C. generator b) Compare lap winding and wave winding	5M 5M	4	L2
	OR			
9	a) With a neat sketch explain about the construction and working principle operation of 3 phase induction motor. b) Explain about synchronous generator	5M 5M	4	L2
10	Explain the following a)Switch fuse unit b)Earth leakage circuit breaker(ELCB)	5M 5M	5	L2
	OR			
11	a) Discuss basic concept of wiring systems and discuss the all the types of wiring systems b) What is meant by elementary calculations for energy consumption?	5M 5M	5	L2