



R22 Regulation

Subject code:4E1AI

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech I Semester Supplementary Examinations, January 2026

FUNDAMENTALS OF ELECTRICAL ENGINEERING

(ECE)

Maximum Marks: 60

Date: 09.01.2026

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

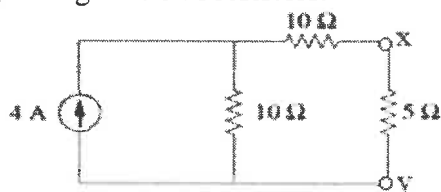
All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	BTL
1.a	Compare mesh and nodal analysis.	1M	1	L1
b	State Maximum power transfer theorem.	1M	1	L1
c	Define R.M.S and Average value.	1M	2	L1
d	Draw the 3 phase balanced circuits, and write the voltage and current relations in star connection.	1M	2	L1
e	Define Ideal and Practical transformer.	1M	3	L1
f	What is an auto transformer.	1M	3	L1
g	Define the Flemings rules for D.C generator and D.C Motor.	1M	4	L1
h	What is slip and write the formula for percentage of slip in a 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	State the Thevenin's theorem. Using Thevenin's equivalent circuit for the circuit shown in figure 2 across x-y terminals, calculate the current flowing through the 5 Ω resistors.	10M	1	L2
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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 series RL.	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) Discuss the Losses in Transformers. b) Draw the phasor diagram of a single-phase transformer on no load and discuss it briefly.	5M 5M	3	L2
8	a) Explain the construction of dc machines and working principle operation of D.C. generator. b) Derive back E.M.F and torque equations of DC motor.	5M 5M	4	L2
OR				
9	a) Give the constructional details and working of three phase induction motors? b) Explain about synchronous generator.	5M 5M	4	L2
10	Explain the following i) Switch fuse unit ii) 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