R22 Regulation *Subject code:4E4BE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, December 2024

POWER SYSTEM – II

(EEE)

Maximum Marks: 60 Date:12.12.2024 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	CO	Bloom Tx
All the following questions carry equal marks (10x1M=10 Marks)			
1.a)	Give reasons for choosing π over *T* representation of lines.	CO1	L2
b)	List the factors affecting corona loss in a transmission line.	CO1	L2
c)	Present the principle of OLTC transformer as a voltage controller.	CO2	L2
d)	List the methods of voltage control?	CO2	L1
e)	What is PU in a power system?	CO3	L1
f)	What is attenuation? How they are caused?	CO3	L1
g)	Mention the limitations of a rod gap arrester.	CO4	L1
h)	What is volt-time curves?	CO4	L1
i)	What are the sequence components of impedance?	CO5	L1
j)	Draw the sequence network connection for double line-to-ground fault.	CO5	L2
	Part-B		
Answer All the following questions. (5X10M=50Marks)			Bloom Tx level
2	A) Deduce an expression for voltage regulation of a short transmission line, giving the phasor diagram. [5M] B) A 3-phase, 50Hz, 150km line has a resistance, inductive reactance and capacitive shunt admittance of 0.1ohm, 0.5ohm and 3 × 10^{-6} mhos per km per phase. If the line delivers 50MW at 110kV and 0.8 p.f. lagging, determine the sending end voltage and current. Assume a Nominal-π circuit for the line. [5M]	CO1	L3 L3
	OR		
3	Explain and derive the Long transmission line parameters by using Rigorous method. [10M]	CO1	L2
4	A) Describe about shunt and capacitors role in voltage control. [5M] B) Discuss about tap changing transformers used for voltage control. [5M]	CO2	L2 L2
	OR		

5	A) Explain series and shunt compensation of lines and discuss their effect on the surge impedance loading of the lines. If shunt compensation is 100%, what happens to SIL and voltage profile? [5M] B) Explain about the un compensated line briefly. [5M]	CO2	L2 L2
6	A) Explain the p.u. system of analyzing power system problems. Discuss the advantages of this method over the absolute method of analysis. [5M] B) Two generators rated at 10 MVA, 13.2 kV and 15 MVA, 13.2 kV are connected in parallel to a busbar. They feed supply to two motors of inputs 8 MVA and 12 MVA respectively. The operating voltage of motors is 12.5 kV. Assuming base quantities as 50 MVA and 13.8 kV, draw the reactance diagram. The percent reactance for generators is 15% and that for motors is 20%. [5M]	CO3	L2 L3
	OR		
7	A) Derive traveling wave equations.[5M] B) Determine the equations for the reflection and refraction coefficients for a short circuited line. [5M]	CO3	L5 L3
8	A) Briefly discuss about various causes of over-voltages in the power system network. [5M] B) What are ground rods and counterpoises? Discuss clearly how these can be used to improve the grounding conditions. Give various arrangements of counterpoise. [5M]	CO4	L3 L2
	OR		
9	Explain, with a neat sketch, the working principle and constructional details of expulsion type lightning arrester. [10M]	CO4	L3
10	A) Find symmetrical components for the given three phase voltages: $V_a = 300\angle -120°$. $V_b = 200\angle 90°$ and $V_c = 100\angle -30°$. [5M] B) Develop the connection diagram of sequence network when a line to line fault occurs in a power network. [5M]	CO5	L3 L3
	OR		
11	A) Describe the significance of positive, negative and zero sequence components. [4M] B) A 30 MVA, 11 kV star connected generators has positive, negative and zero sequence reactance's of 30%, 25%, 10% respectively. A reactor with 6% reactance based on the rating of the generator is placed in the neutral to ground connection. A line to ground fault occurs at the terminals of the generator when it is operating at rated voltage. Determine the initial symmetrical line to ground r.m.s fault current. Also find the line to line voltages. [6M]	CO5	L2 L3