Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – MAY 2025

Date: 24-05-2025 **Time:** 09:30 am – 12:30 pm

School: SOE	**Program:** B. Tech-EEE	
Course Code: EEE3002	**Course Name:** Power System Analysis	
Semester: VI	**Max Marks:** 100	**Weightage:** 50%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Marks	**24**	**21**	**21**	**22**	**12**

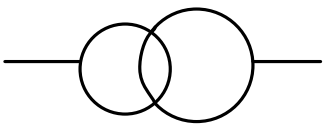
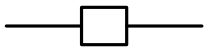
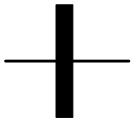
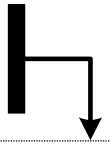
Instructions:

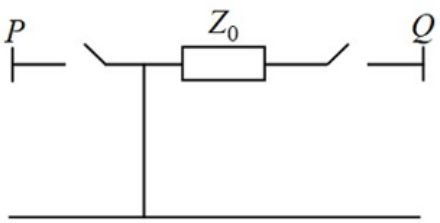
(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. **10Q x 2M=20M**

1.	Identify the names of the following symbols used in one-line diagrams. a)  b)  c)  d) 	2 Marks	L1	CO1
2.	Outline the differences between absolute form and per unit form of representations of a power system network.	2 Marks	L1	CO1
3.	For load flow solutions, which quantities are specified and to be determined for each type of bus?	2 Marks	L1	CO2
4.	Define load flow study in power systems.	2 Marks	L1	CO2
5.	List any two required input data items for carrying out load flow analysis in a power system as per the IEEE 3002 standard.	2 Marks	L1	CO2
6.	Identify the winding configuration of a three-phase transformer from the following given zero sequence network of a transformer.	2 Marks	L1	CO3

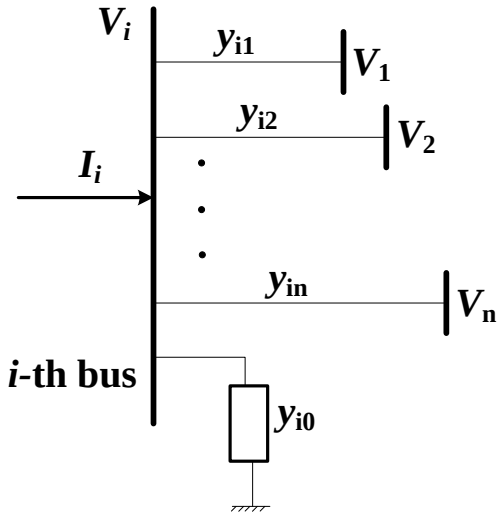
				
7.	What is the doubling effect in a power system?	2 Marks	L1	CO3
8.	If the supply frequency is 60 Hz, what is the frequency of positive, negative, and zero sequence components?	2 Marks	L1	CO3
9.	Outline the conditions for the stability of a synchronous machine used in a power system.	2 Marks	L1	CO4
10.	List the types of contingencies in a power system.	2 Marks	L1	CO5

Part B

Answer the Questions. **Total Marks 80M**

11.	**a.**	A single phase, 10 KVA, 100 V/500 V transformer is given. Calculate V_{1b}, V_{2b}, I_{1b}, I_{2b}, S_b, Z_{1b}, and Z_{2b}. Here the suffix 'b' indicates base.	**10 Marks**	**L3**	**CO1**
	b.	A single-phase two-winding transformer is rated 25 kVA, 1100 V/ 440 V, 50 Hz. The equivalent leakage impedance of the transformer referred to the low voltage side is $\mathbf{0.06\angle 78^0\ \Omega}$. Using the transformer rating as values, determine the per-unit leakage impedance referred to low voltage winding and referred to high voltage winding.	**10 Marks**	**L3**	**CO1**
		Or			
12.	**a.**	A single-phase load with an impedance of $Z_L = (1 + j\ 2)\ \Omega$ is supplied from 200 V, 10 A mains. Calculate V_b, I_b, Z_b, S_b, V(p.u), I(p.u), Z(p.u), R(p.u), X(p.u),P(p.u), and Q(p.u). Here, the suffix 'b' indicates base, and p.u indicates per unit.	**10 Marks**	**L3**	**CO1**
	b.	The impedance referred to primary of a 11 kV/ 132 kV, Y/Δ three-phase transformer is 0.2 p.u. The MVA rating of transformer is 10 MVA. Calculate actual impedance referred to primary and secondary windings.	**10 Marks**	**L3**	**CO1**

13.	For *i*-th bus of a power system shown in below figure, describe bus loading equations (V_i and net injected powers P_i & Q_i)	**15 Marks**	**L2**	**CO2**

				
Or				
14.	Explain the concept, importance, and prerequisites of load flow study in a power system.	**15 Marks**	**L2**	**CO2**

15.	Explain the short circuit currents and reactances with reference to unloaded synchronous generator on the occurrence of three phase fault.	**15 Marks**	**L2**	**CO3**
Or				
16.	Describe all the steps involved in carrying out fault analysis.	**15 Marks**	**L2**	**CO3**

17.		Explain the equal area criterion for a sudden change in the mechanical input of a synchronous generator.	**20 Marks**	**L2**	**CO4**
Or					
18.	**a.**	Describe power system stability by classifying it.	**15 Marks**	**L2**	**CO4**
	b.	Compute the kinetic energy stored in a 50 Hz, 10 MVA, 2 pole synchronous generator having moment of inertia of 35 kg-m^2.	**5 Marks**	**L2**	**CO4**

19.	Describe the full AC power flow contingency analysis procedure with the help of a flowchart.	**10 Marks**	**L2**	**CO5**
Or				
20.	Explain the following with respect to contingency analysis **i.** Generation Outages **ii.** Transmission Outages	**10 Marks**	**L2**	**CO5**