Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

Mid - Term Examinations – March 2026

Date: 12- 03-2026 **Time:** 02:00pm – 03:30pm

School: SOE	**Program:** B. Tech (EEE)	
Course Code : EEE3002	**Course Name:** Power System Analysis	
Semester: VI	**Max Marks**: 50	**Weightage**: 25%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**
Marks	**14**	**12**	**12**	**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. **5Q x 2M=10M**

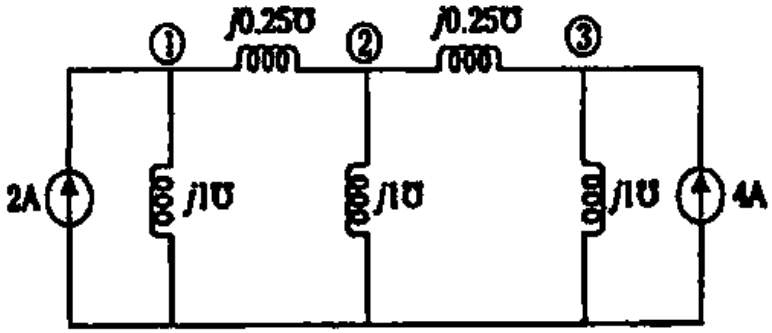
1	Define the term Single Line diagram? List the need of single line diagram.	**2 Marks**	**L1**	**CO1**
2	List the advantages of per unit system.	**2 Marks**	**L1**	**CO1**
3	State the purpose of forming the Ybus matrix.	**2 Marks**	**L1**	**CO2**
4	List the types of load flow solution techniques used in power system analysis.	**2 Marks**	**L1**	**CO3**
5	Define a single line-to-ground (LG) fault.	**2 Marks**	**L1**	**CO4**

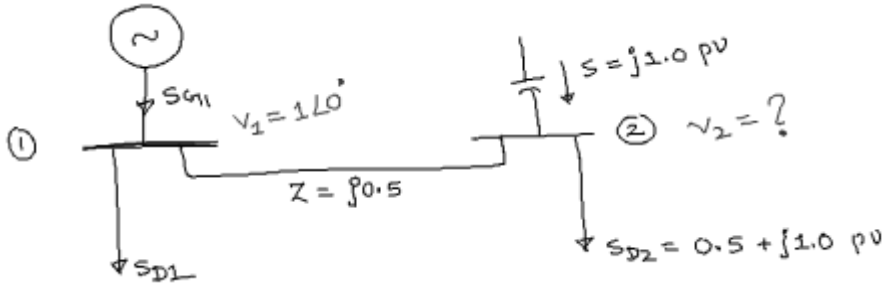
Part B

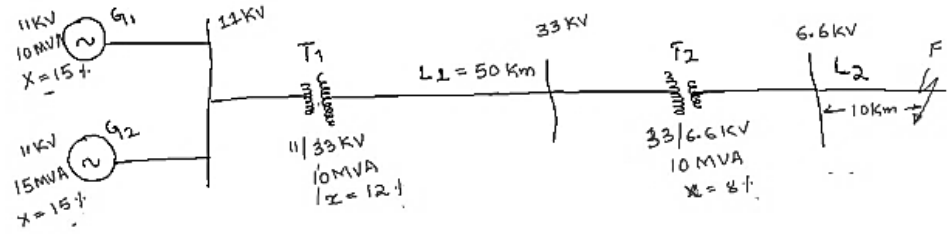
Answer the Questions. **Total Marks 40M**

6.	An electrical engineer is analysing a single-phase industrial load connected to a low-voltage distribution system to simplify calculations using the per-unit system. The load operates under the following conditions: a. Rated supply voltage: 230 V b. Real power consumed by the load: 5 kW	**10 Marks**	**L3**	**CO1**

	c. Operating power factor: 0.8 lagging For system normalization, the engineer selects the following base values: Base apparent power, $\boldsymbol{S_{base}} = \mathbf{10}kVA$, Base voltage, $\boldsymbol{V_{base}} = \mathbf{230}V$. Using the above information: i. Determine the per-unit value of the operating voltage. ii. Calculate the per-unit current drawn by the load. iii. Compute the per-unit real power of the load.			
	Or			
7.	For the power system data draw the Single line diagram and draw the per-unit reactance diagram of the system., the specifications of the components are as follows: • Generator G1: 20 kV, 100 MVA, $X = 0.2\ \Omega$ • Generator G2: 25 kV, 95 MVA, $X = 0.3\ \Omega$ • Transformer T1: 25 kV / 220 kV, 70 MVA, $X = 0.12\ \Omega$ • Transformer T2: 220 kV / 25 kV, 90 MVA, $X = 0.20\ \Omega$ • Transmission Line: 220 kV, $X = 150\,\Omega$ and base voltage in transmission line as 220 kV	**10 Marks**	**L3**	**CO1**

8.	Consider the power system shown in Fig. 1. (a) Select an appropriate method for forming the bus admittance matrix $\mathbf{Y_{Bus}}$ and justify its suitability for the given system. (b) Apply the selected method to compute the complete $\mathbf{Y_{Bus}}$matrix of the system  Fig.1	**10 Marks**	**L3**	**CO2**
	Or			
9.	A 4-bus distribution system supplying a residential area is to be analyzed using load flow studies.The transmission line impedances (in per unit) between the buses are given below: Line between Bus 1 and Bus 2: Z_{12} = j0.20 Line between Bus 2 and Bus 3: Z_{23} = 0.015 + j0.25 Line between Bus 3 and Bus 4: Z_{34} = j0.35 Line between Bus 1 and Bus 4: Z_{14} = j0.40 Shunt elements are neglected. Perform the following tasks: a. Draw the single-line diagram of the given 4-bus system with proper bus numbering and line impedances. b. Calculate the admittance of each transmission line. c. Form the bus admittance matrix (Y_Bus) using the inspection method. d. Write the final Y_Bus matrix clearly in matrix form.	**10Marks**	**L3**	**CO2**

10.	For a given 5-bus power system, apply IEEE 3002 standards to prepare and tabulate all necessary system, generator, load, line, and transformer data required before performing load flow analysis.	**10Marks**	**L3**	**CO3**
	Or			
11.	Compute the voltage at Bus 2 for the simple system shown in Fig. 2 using the Gauss–Seidel (GS) method, if V1=1∠0∘  Fig. 2	**10Marks**	**L3**	**CO3**

12.	A radial network is shown in Fig.1. The parameters of the overhead line are Z=(0.1+j0.4) ohm/km. L1 has a length of 50 km. A short circuit occurs on the line L2 at a distance of 10 km from the 6.6 kV bus. Determine the short circuit current.  Fig.3	**10 Marks**	**L3**	**CO4**
	Or			
13.	In a power system, frequent faults are observed during summer and monsoon seasons. a. Identify four common causes of faults in power systems. b. Explain how each cause leads to a fault in transmission lines or transformers. c. Suggest two simple methods to reduce the occurrence of such faults.	**10 Marks**	**L3**	**CO4**