Hall Ticket Number:

Code No. : 14366 AS N/O

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A+ + Grade

B.E. (E.E.E.) IV-Semester Advanced Suppl. Examinations, Aug./Sept-2023

Power Systems-II

Time: **3 hours** Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10× 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	What do you understand by medium transmission lines? How capacitance effects are taken into account in such lines?	2	2	1	1,2
2.	What are the effects of Corona?	2	1	1	1,2
3.	Advantages of Y bus admittance matrix?	2	2	2	1,2
4.	Find the base Impedance for a 10kV, 10MVA, 3 –phase system.	2	3	2	1,2
5.	Explain the harmful effects of short-circuit fault on the power system.	2	1	3	1,2
6.	What is the use of Z bus in power systems?	2	2	3	1,2
7.	The positive sequence network of a power system is similar to the negative sequence network. What do you infer from it?	2	4	4	1,2
8.	In a 3-Ø system, it has been found that negative sequence components and zero sequence components are absent. What do you conclude from it?	2	4	4	1,2
9.	What is the velocity of wave Propagation?	2	2	5	1,2
10.	Write reflection coefficient of voltage and current wave equation of a transmission line.	2	1	5	1,2
	Part-B (5×8 = 40 Marks)				
11. a)	Evaluate the generalised circuit constants for medium line — nominal π method.	4	2	1	1,2
b)	Explain the following terms with reference to corona : (i) Critical disruptive voltage (ii) Power loss due to corona	4	2	1	1,2

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12. a) The single-line diagram of a three-phase system is shown in Fig. 1. Using the common base Sb = 50 MVA, draw the impedance diagram in per unit including the load impedance. The manufacturer's nominal ratings are given as follows: — 6 | 4 | 2 | 1,2

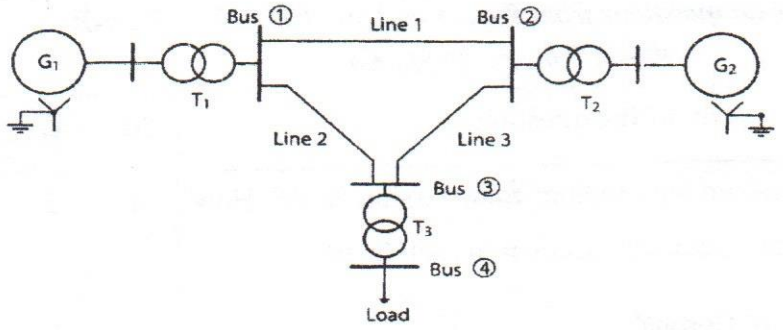


FIGURE 1 Single-line diagram of Example 1.

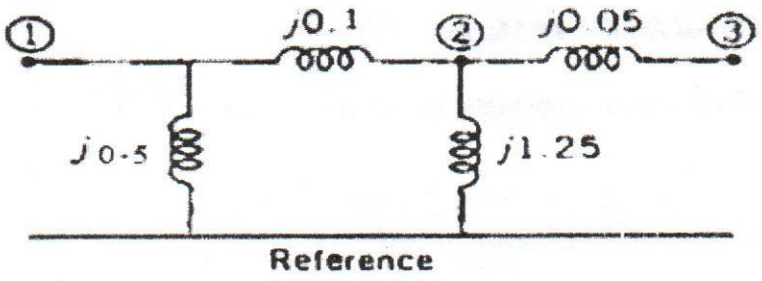
Device	S_n	$U_{(L\text{-}L)n}$	X_n
Generator G_1:	48 MVA	20 kV	20%
Generator G_2:	25 MVA	13.8 kV	15%
Transformer T1:	50 MVA	20/110 kV	8%
Transformer T2:	30 MVA	13.8/110 kV	6%
Transformer T3:	50 MVA	11/110 kV	10%

The three-phase load at bus 4 absorbs 60 MVA at 0.75 power factor (lagging), and lines 1, 2, and 3 have the reactance of 40Ω, 32 Ω, and 30Ω, respectively.

b) Compare Gauss- seidal and Newton Raphson methods commonly used in Load flow studies? — 2 | 3 | 2 | 1,2

13. a) Explain the methods to calculate the fault current for a 3 phase fault. — 3 | 1 | 3 | 1,2

b) Construct the Z bus by using the algorithms for the below network by following the bus order 0-1-2-3 — 5 | 3 | 3 | 1,2



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14. a)	A 3-phase, 75 MVA, 11·8 kV star-connected alternator with a solidly earthed neutral point has the following p.u. impedances based on rated phase voltage and rated phase current : Positive phase sequence impedance = j 2 p.u. Negative phase sequence impedance = j 0·16 p.u. Zero phase sequence impedance = j 0·08 p.u. Determine the steady-state fault current for the following : (i) one line-to-earth fault (ii) Two line-to-earth fault. The generated e.m.f. per phase is equal to the rated voltage	4	3	4	1,2
b)	Derive an expression for fault current for doube line-to-ground fault by symmetrical components method	4	2	4	1,2
15. a)	What are the properties of Bewley's lattice diagram?	4	2	5	1,2
b)	Derive the expression for reflection and refraction coefficient of a Transmission line terminated with an Impedamce.	4	2	5	1,2
16. a)	A (medium) single phase transmission line 100 km long has the following constants : Resistance/km = 0·25 Ω ; Reactance/km = 0·8 Ω Susceptance/km = 14 × 10−6 siemen ; Receiving end line voltage = 66,000 V Assuming that the total capacitance of the line is localised at the receiving end alone, determine (i) the sending end current (ii) the sending end voltage (iii) regulation and (iv) supply power factor. The line is delivering 15,000 kW at 0.8 power factor lagging. Draw the phasor diagram to illustrate your calculations.	4	3	1	1,2
b)	Draw the flow chart for Gauss Seidel Method to Solve Power Flow Problem?	4	2	2	1,2
17.	Answer any ***two*** of the following:				
a)	Explain Causes and Effects of short-circuit?	4	1	3	1,2
b)	In a 3-phase, 4-wire system, currents in R, Y and B lines under abnormal conditions of loading are: IR = 150∟ ∠45° A ; IY = 250∟ ∠150° A ; IB = 100 ∟∠300° A Calculate the zero, positive and negative phase sequence currents in the R-line and return current in the neutral connection.	4	4	4	1,2
c)	What are the specifications of a travelling wave?	4	1	5	1,2

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	21.25%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	38.75%

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