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Code No. : 14366 N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (E.E.E.) IV-Semester Main & Backlog Examinations, July/August-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.	List the applications of power circle diagrams.	2	2	1	1,2
2.	What is meant by propagation constant?	2	1	1	1,2
3.	What is the importance of slack bus in load flow study?	2	4	2	1,2
4.	Write the advantages of per unit system.	2	2	2	1,2
5.	Why single line to ground fault current is more than the 3 phase symmetrical fault-current generator terminals?	2	4	3	1,2
6.	Define short circuit capacity of a bus.	2	1	3	1,2
7.	Draw the zero sequence network of a transformer when its primary and secondary are connected in $\Delta - \Delta$ configuration.	2	2	4	1,2
8.	Write the boundary conditions of double line to ground fault.	2	2	4	1,2
9.	Mention the specifications of a travelling wave.	2	1	5	1,2
10.	Define reflection co-efficient of the voltage wave.	2	1	5	1,2
Part-B (5×8 = 40 Marks)					
11. a)	What is nominal circuit? Find ABCD constants for a nominal-T circuit of a transmission line?	4	2	1	1,2
b)	A 3 phase, 50Hz, 132 KV transmission line consists of conductors of 1.17 cm dia and spaced equilaterally at a distance of 3 meters. The line conductors have smooth surface with value for $m=0.96$. The barometric pressure is 72cm of Hg and temperature of 20 C ⁰ . Determine the fair and foul weather corona loss per km per phase.	4	3	1	1,2
12. a)	Explain the Gauss seidel load flow solution method in steps.	4	1	2	1,2
b)	The parameters of a 4-bus system are as under:	4	3	2	1,2
	Bus code Line admittance Charging admittance				
	1-2 0.2 + j 0.8 0.0				
	2-3 0.3 + j 0.9 0.0				
	2-4 0.25 + j 1.0 0.0				
	3-4 0.2 + j 0.8 0.0				
	1-3 0.1 + j0.4 0.0				
	Draw the network and find bus admittance matrix.				

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13. a)	<p>A synchronous generator and a synchronous motor each rated 25 MVA, 11 KV having 15% sub – transient reactance are connected through transformers and a line as shown in fig. The Transformers are rated 25 MVA, 11/66 KV and 66/11 KV with leakage reactance of 10% each. The line has a reactance of 10% on a base of 25 MVA, 66 KV. The motor is drawing 15 MW at 0.5 power factor leading at a terminal voltage of 10.6 KV. When a symmetrical three phase fault occurs at the motor terminals at point A. Find the sub – transient current in the generator, Motor and Fault.</p>	4	3	3	1,2
b)	Write the procedure to calculate the fault current for a 3 phase fault in alternator using Thevenin's theorem.	4	2	3	1,2
14. a)	A star connected resistive load is connected across a balanced three phase supply of 415V, $R_1= 20 \text{ Ohm}$, $R_2= 250 \text{ Ohm}$, $R_3= 15 \text{ Ohm}$. Calculate symmetrical components of line currents.	4	3	4	1,2
b)	Derive the equivalent circuit and necessary equations for an LL fault in transmission lines.	4	2	4	1,2
15. a)	Discuss the behavior of a travelling wave when it reaches the end of (i) open circuited (ii) short circuited transmission line. Derive the reflection and refraction coefficients of voltage and current wave forms.	4	2	5	1,2
b)	A 300 kV surge travels on a cable with a surge impedance 30 ohm towards its junction with an overhead line which has a surge impedance of 450 ohm. Find (i) Transmitted Voltage ii) Transmitted Current iii) Reflected Voltage (iv) Reflected current	4	3	5	1,2
16. a)	A single phase 11 KV transmission line with a length of 15 Km is to deliver 500 KVA. The inductive reactance of the line is 0.5 ohm/ Km and resistance is 0.3 ohm/Km. Calculate the efficiency and regulation of line for 0.8 lagging P.F.	4	3	1	1,2
b)	Compare Newton Raphson and Fast decoupled load flow methods.	4	2	2	1,2
17.	Answer any <i>two</i> of the following:				
a)	Explain the necessary steps to develop a Z bus.	4	1	3	1,2
b)	A single line to earth fault occurs on a feeder. The sequence impedances upto fault point are $0.3+j0.6$, $0.3+j0.55$ and $1+j0.78 \text{ pu}$. The fault resistance is 0.66 pu. If voltage is $1 \angle 0^\circ$. Find fault current and voltage of faulty phase at fault point.	4	3	4	1,2
c)	Write short notes on Bewley lattice diagram.	4	2	5	1,2

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

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%
