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Code No. : 14346

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (E.E.E.) IV-Semester Main & Backlog Examinations, July-2022

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.	How transmission lines are classified?	2	2	1	1
2.	Write the values of A , B , C and D constants for a short transmission line.	2	2	1	1
3.	Discuss the importance of slack bus used in load flow studies.	2	2	2	1
4.	Why do we go for iterative methods to solve load problems?	2	2	2	1
5.	Define short circuit capacity.	2	1	3	1
6.	Explain the significance of sub transient reactance in short circuit studies.	2	1	3	1
7.	Compare Symmetrical and unsymmetrical faults.	2	2	4	1
8.	List the various types of shunt and series faults.	2	2	4	1
9.	List the causes of over voltages.	2	2	5	1
10.	Discuss bewley lattice diagram?	2	2	5	1
Part-B (5 × 8 = 40 Marks)					
11. a)	Discuss the factors which affect the corona.	4	2	1	1
b)	An over head 3-phase transmission line delivers 5000kW at 22 kV at 0.8 p.f. lagging. The resistance and reactance of each conductor is 4 ohm and 6 ohm respectively. Determine:(i) sending end voltage (ii)percentage regulation (iii)transmission efficiency.	4	3	1	1,2
12. a)	<p>Draw the per unit diagram of given network.</p>	4	3	2	1,2
b)	Explain the Gauss Seidel load flow solution method in steps.	4	1	2	1
13. a)	Describe the transients on a transmission line and derive necessary expressions	4	2	3	1,6

b)	Determine the Z_{Bus} using building algorithm for a power system whose element data is given in the following table:	4	3	3	1,2																		
<table border="1"> <thead> <tr> <th>Element No.</th> <th>Connected between bus No.</th> <th>Self reactance (p.u)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1-2</td> <td>0.1</td> </tr> <tr> <td>2</td> <td>1-3</td> <td>0.2</td> </tr> <tr> <td>3</td> <td>2-3</td> <td>0.15</td> </tr> </tbody> </table>						Element No.	Connected between bus No.	Self reactance (p.u)	1	1-2	0.1	2	1-3	0.2	3	2-3	0.15						
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14. a)	Explain the sequence networks of unloaded synchronous generators.	4	1	4	1,6																		
b)	A 50 MVA, 11 KV, 3 phase alternator is connected to a 3 phase transmission line. The per unit positive, negative and zero sequence impedances of the alternator are $j0.15$, $j0.15$ and $j0.05$ respectively. The neutral of the alternator is connected to ground through an inductive reactor of $j0.08$ p.u. The per unit positive, negative and zero sequence impedances of the transmission line are $j0.1$, $j0.1$ and $j0.4$ respectively. All per unit values are based on the machine ratings. A solid ground fault occurs at one phase of the far end of the transmission line. Find voltage of the alternator neutral with respect to ground during fault.	4	3	4	1,2																		
15. a)	Develop expression for reflection and refraction co-efficient for I & V when line is terminated with an inductance L.	4	4	5	1																		
b)	Two stations are connected together by an underground cable having a surge impedance of 50 ohm joined to an overhead line with a surge impedance of 600 ohm. If a surge having a maximum value of 100 KV travels along the cable towards the junction with the overhead line, determine the value of the reflected and transmitted wave of voltage and current at the junction.	4	3	5	1,2																		
16. a)	Derive regulation and efficiency of a medium length transmission line and draw the phasor diagram for T configuration.	4	2	1	1																		
b)	<p>The parameters of a 4-bus system are as under:</p> <table border="1"> <thead> <tr> <th>Bus code</th> <th>Line admittance</th> <th>Charging admittance</th> </tr> </thead> <tbody> <tr> <td>1-2</td> <td>$0.2 + j 0.8$</td> <td>0.0</td> </tr> <tr> <td>2-3</td> <td>$0.3 + j 0.9$</td> <td>0.0</td> </tr> <tr> <td>2-4</td> <td>$0.25 + j 1.0$</td> <td>0.0</td> </tr> <tr> <td>3-4</td> <td>$0.2 + j 0.8$</td> <td>0.0</td> </tr> <tr> <td>1-3</td> <td>$0.1 + j0.4$</td> <td>0.0</td> </tr> </tbody> </table> <p>Draw the network and find bus admittance matrix.</p>	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	4	3	2	1,2
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17.	Answer any <i>two</i> of the following:																						
a)	What do you understand by a short circuits? Discuss the possible causes of short circuits in power systems.	4	1	3	1,6																		
b)	Define symmetrical components? Why are they used in power system fault analysis? Explain in details.	4	2	4	1,6																		
c)	Show that the travelling wave moves with a velocity of light on the overhead line.	4	2	5	1																		

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

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	45%
iii)	Blooms Taxonomy Level – 3 & 4	35%
