

Hall Ticket Number:

1 6 0 2 2 0 7 3 4 0 2 1

Code No. : 14342 AS

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (E.E.E.) IV-Semester Advanced Supplementary Examinations, September-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.	What is the importance of generalized circuit constants of a transmission line?	2	1	1	1																								
2.	Write about Visual critical voltage with reference to corona.	2	2	1	1																								
3.	Discuss the necessity of load flow studies?	2	2	2	1																								
4.	Mention the advantages of per unit systems.	2	2	2	1																								
5.	What is bus impedance matrix? Mention its importance.	2	1	3	1																								
6.	Discuss short circuit capacity.	2	2	3	1																								
7.	Define positive and negative sequence components.	2	1	4	1																								
8.	For a fault at a given location, rank the various faults in the order of severity.	2	2	4	1																								
9.	What is meant by crest and Wave front of travelling wave?	2	1	5	1																								
10.	Give the reflection and refraction coefficients of a short circuited line?	2	2	5	1																								
Part-B (5 × 8 = 40 Marks)																													
11. a)	Derive the expressions for regulation and efficiency of a short transmission line. Draw required circuit and phasor diagram.	4	4	1	1																								
b)	A single phase overhead transmission line is transmitting 1200kW power to factory at 11kV at 0.8 P.F lag. The line resistance and loop reactance of the line are 3ohm and 5ohm phase. Determine i) Source voltage ii) Percentage regulation iii) Efficiency.	4	3	1	1,2																								
12. a)	Compare G-S method and N-R methods of load flow solutions.	3	2	2	1																								
b)	Obtain the voltages at all buses for the three-bus system shown in figure at the end of the first iteration by GS method.	5	3	2	1,2																								
Line data																													
<table border="1"> <thead> <tr> <th>From</th> <th>To</th> <th>G(pu)</th> <th>B(pu)</th> <th>Bc/2</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2</td> <td>0.02</td> <td>0.04</td> <td>0.0</td> </tr> <tr> <td>1</td> <td>3</td> <td>0.01</td> <td>0.03</td> <td>0.0</td> </tr> <tr> <td>2</td> <td>3</td> <td>0.0125</td> <td>0.02</td> <td>0.0</td> </tr> </tbody> </table>						From	To	G(pu)	B(pu)	Bc/2	1	2	0.02	0.04	0.0	1	3	0.01	0.03	0.0	2	3	0.0125	0.02	0.0				
From	To	G(pu)	B(pu)	Bc/2																									
1	2	0.02	0.04	0.0																									
1	3	0.01	0.03	0.0																									
2	3	0.0125	0.02	0.0																									
Bus data																													
<table border="1"> <thead> <tr> <th>Bus no.</th> <th>P_G</th> <th>Q_G</th> <th>P_L</th> <th>Q_L</th> <th>V_{SP}</th> </tr> </thead> <tbody> <tr> <td>1 Slack</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>1.05</td> </tr> <tr> <td>2 PV</td> <td>0.5</td> <td>-</td> <td>-</td> <td>-</td> <td>1.04</td> </tr> <tr> <td>3 PQ</td> <td>-</td> <td>-</td> <td>0.3</td> <td>0.1</td> <td>-</td> </tr> </tbody> </table>						Bus no.	P _G	Q _G	P _L	Q _L	V _{SP}	1 Slack	-	-	-	-	1.05	2 PV	0.5	-	-	-	1.04	3 PQ	-	-	0.3	0.1	-
Bus no.	P _G	Q _G	P _L	Q _L	V _{SP}																								
1 Slack	-	-	-	-	1.05																								
2 PV	0.5	-	-	-	1.04																								
3 PQ	-	-	0.3	0.1	-																								

Contd... 2

13. a)	What is the importance to study the short circuit analysis? Discuss the possible causes of short circuits in the power system.	3	2	3	1
b)	A 11 KV, 100 MVA alternator having a sub-transient reactance of 0.25 p.u is supplying a 50 MVA motor having a sub-transient reactance of 0.2 p.u through a transmission line. The line reactance is 0.05 p.u on a base of 100 MVA. The motor is drawing 40 MW at 0.8 p.f leading with a terminal voltage of 10.95 KV when a 3-phase fault occurs at the generator terminals. Calculate the total current in generator and motor under fault condition.	5	3	3	1,2
14. a)	Explain Power Invariance of three phase circuit using symmetrical components.	4	1	4	1
b)	A delta connected resistive load is connected across a balanced three phase supply of 415V, $R_{ab}= 20 \text{ Ohm}$, $R_{bc}= 250 \text{ Ohm}$, $R_{ca}= 15 \text{ Ohm}$. Find symmetrical components of line currents and delta currents.	4	3	4	1,2
15. a)	write about travelling or propagation of surges and derive the mathematical expression for it.	4	4	5	1
b)	Discuss Bewley's Lattice Diagram.	4	2	5	1
16. a)	How the corona forms in power systems and write the advantages and disadvantages.	4	2	1	1
b)	With the help of a neat flow chart, explain the Newton-Raphson method of load flow solution when the system contains voltage controlled busses in addition to swing bus and load bus.	4	2	2	1
17.	Answer any <i>two</i> of the following:				
a)	The impedances connected between various buses are : $X_{10}= 1.24\Omega$, $X_{30}= 1.25\Omega$, $X_{12}= 0.25\Omega$, $X_{23}=0.4\Omega$. In which '0' is the reference node. All the impedances are in p.u. Derive the bus impedance matrix for the network connecting the above impedances.	4	3	3	1,2
b)	Draw and explain the positive, negative, zero sequence impedance diagrams for different 3-phase transformer winding connections.	4	2	4	1
c)	Explain about termination of line with open circuit for travelling wave.	4	1	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	42.5%
iii)	Blooms Taxonomy Level - 3 & 4	37.5%

14, 15