Hall Ticket Number:

Code No. : 16335

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (E.E.E.) VI-Semester Main & Backlog Examinations, June-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.	Write the advantages of power circle diagrams?	2	1	1	1
2.	Define tuned power lines.	2	1	1	1
3.	Discuss the importance of slack bus used in load flow studies.	2	2	2	1
4.	Mention any two advantages of NR method over GS method.	2	2	2	1
5.	Define doubling effect and DC off set current.	2	1	3	1
6.	List the assumptions made in short circuit studies?	2	1	3	1
7.	List and define various symmetrical components of 3 phase power system.	2	2	4	1
8.	Draw the sequence impedance network for LG fault.	2	2	4	1
9.	Mention any two causes of over voltages.	2	2	5	1
10.	Give the variation of current and voltage on an overhead line when one end of the line is short circuited.	2	2	5	1
	Part-B (5 × 8 = 40 Marks)				
11. a)	Derive the A, B, C, D constants of a medium length transmission line and draw the phasor diagram for T configuration.	3	2	1	1
b)	Determine the corona loss of a 3 phase line 160Km long, conductor diameter 1.036 cm, 2.44 m delta spacing, air temperature 26.67^0 C, corresponding to an appropriate barometric pressure of 73.15 cm, operating voltage 110 kv at 50 Hz, mo is 0.85.	5	3	1	1,2
12. a)	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

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

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

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	b)	Define per unit system. Mention its advantages, disadvantages And determine the per unit impedance of a transmission line having an impedance of (30+j110) ohm on 100 MVA and 132 KV base voltage.	3	3	2	1,2
13.	a)	Write a short notes on fault current in synchronous machine.	3	1	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)	Derive the equivalent circuit and necessary equations for an LL fault.	4	2	4	1
	b)	The line currents in amperes in phases a, b, and c respectively are 100+j150, 500-j650 and -400+j800 referred to the same reference vector. Find the symmetrical components of currents.	4	3	4	1,2
15.	a)	Derive expression for reflection and refraction co-efficient for I & V when line is terminated with an impedance Z.	4	2	5	1
	b)	An overhead transmission line 300 km having a single impedance of 500 ohm is short circuited at one end and a steady state voltage of 3000V is applied suddenly at the other end. Neglecting the resistance explain with diagrams. How the current and voltage change at different parts of the line and calculate the current at sending end of the line 0.004 sec after the voltage has applied.	4	4	5	1,2
16.	a)	Discuss critical disruptive, critical visual voltages, corona loss and write its formulas.	4	2	1	1
	b)	The parameters of a 4-bus system are as under: 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.	4	3	2	1,2
17.		Answer any ***two*** of the following:				
	a)	Describe the necessary steps to build a bus impedance matrix.	4	2	3	1
	b)	Explain Power Invariance of three phase circuit using symmetrical components.	4	1	4	1
	c)	Draw and explain Bewley lattice diagram.	4	2	5	1

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	38.75%
iii)	Blooms Taxonomy Level – 3 & 4	40%

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