

$$62+2=64.$$

SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

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Total number of pages: [2]

Total number of questions: 06

B.Tech. || EE || 8th Sem | 7th sem

Power System Analysis

Subject Code: BTEE-801

(RG/RP)

Paper ID: M/18 (for office use)

(2011 batch onwards)

Max Marks: 60

Time allowed: 3 Hrs

Important Instructions:

- All questions are compulsory
- Assume any missing data

PART A (2×10)

All COs

Q. 1. Short-Answer Questions:

- What is voltage controlled bus?
- Name the best method for accurate load flow with reasons.
- Define Synchronous impedance.
- The per unit impedance of a circuit element is 0.18 if the base KV and base MVA are halved, what will be the new value of per unit impedance?
- Differentiate between steady state stability and transient stability of a power system.
- Mention significance of a single line diagram of electrical networks.
- Write power flow equations of an N bus power system.
- The line currents in a 3 phase system are $I_a = 5 \angle 60^\circ$, $I_b = 5 \angle -60^\circ$ and $I_c = 0$. Find the symmetrical components.
- Write the expression for base impedance of a power system.
- Why Y bus is preferred over Z bus in load flow studies?

PART B (8×5)

Q. 2. Formulate the mathematical model for load flow study of a power system CO2 using any method.

OR

The system data for a load flow problem are given by table -1 and table-2. CO2

i) Compute Y bus

ii) Determine bus voltages at the end of 1st iteration by Gauss Seidel method. Take acceleration factor as 1.6.

Table-1

Bus code of lines	Admittance (p.u)
1-2	2-j8
1-3	1-j4
2-3	0.6-j2.5

Table-2

Bus code	P demand in p.u	Q Demand in p.u	V, p.u	Remarks
1	-	-	1.06	Slack
2	0.5	0.2	-	PQ
3	0.4	0.3	-	PQ

- Q. 3. Explain how the fault current is calculated using symmetrical components in case of single line to ground fault. Also draw the sequence network in case of fault. CO3

OR

A 25MVA, 13.2 KV alternator with solidly grounded neutral has a subtransient reactance of 0.25 p.u. the negative and zero sequence reactances are 0.35 and 0.1 p.u. A single line to ground fault occurs at terminals of an unloaded alternator, determine the fault current and line to line voltages. CO3

- Q. 4. Using symmetrical component transformation technique, derive the formulation of double line to ground fault on a power system. CO3

OR

Draw zero sequence networks for three phase transformer with connections i) Delta-Delta CO3

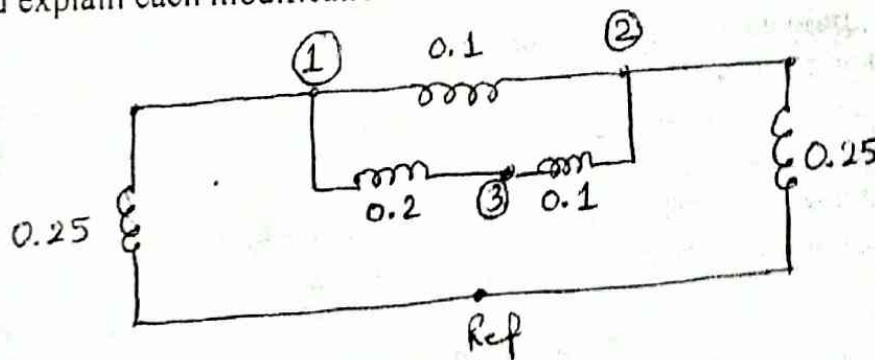
ii) Star (isolated neutral)- Delta

iii) Delta-Star (neutral grounded)

- Q. 5. Derive power flow equations for 'N' bus power system starting from fundamentals. CO2

OR

Build Z_{bus} for the 3 bus network shown below using Z_{bus} building algorithm and explain each modification. CO2



- Q. 6. a) Derive swing equation and discuss its applications in the study of power system stability. CO4
b) Short note on system modeling of synchronous machine.

OR

What is Equal area criterion? Discuss its applications for the system stability. CO4