

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022

Power System Analysis – II

Time: 3 hrs.

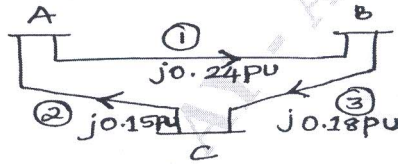
Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- Define a Primitive network and hence derive an equation for calculating Y_{bus} by Singular Transformation method. (08 Marks)
 - For the network shown below in Fig. Q1(b), find Y_{bus} by singular Transformation method. (08 Marks)

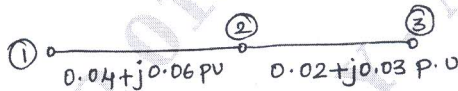
Fig. Q1(b)



OR

- Develop the Gauss – Seidel load flow model for a power system with a slack bus and only PQ buses. (08 Marks)
 - For the network shown in Fig. Q2(b), determine the voltage at bus (2) at the end of 1st iteration. Line impedances are shown in P.U. Given
Bus – 1 is Slack bus with $V_1 = 1 \angle 0^\circ$ p.u.
Bus – 2 is PQ bus with $P_2 + j Q_2 = -5.96 + j1.4$.
Bus – 3 $|V_3| = 1.02$ p.u. (08 Marks)

Fig. Q2(b)



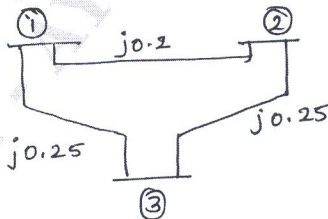
Module-2

- Explain Newton Raphson method of Load flow analysis with flow chart. (08 Marks)
 - Deduce the FDLF model stating clearly all assumptions. (08 Marks)

OR

- Formulate the Newton – Raphson equation for the system shown in Fig. Q4. (16 Marks)

Fig. Q4



Bus	Voltage	Generation		Load	
		P	Q	P	Q
1	$1.2 \angle 0^\circ$	-	-	-	-
2	-	0.7	0.5	0.3	0.2
3	-	-	-	0.6	0.4

Module-3

- 5 a. Deduce the condition for Optimal load dispatch neglecting transmission losses. (08 Marks)
 b. The fuel cost of 2 units is given by
 $F_1 = 1.5 + 20 P_{G1} + 0.1 P_{G1}^2$ Rs/hr ; $F_2 = 1.9 + 30 P_{G2} + 0.1 P_{G2}^2$
 Where P_{G1} and P_{G2} are in MW. Find the optimal load scheduling neglecting loss when demand is 200MW. (08 Marks)

OR

- 6 a. Define Unit Commitment. Explain Dynamic programming method of Unit Commitment solution with flow chart. (08 Marks)
 b. A Generator is supplying a load and an incremental change in load of 4MW requires a generator to be increased by 6MW. The incremental cost at the plant is 30 Rs/MW. hr, what is the incremental cost at receiving end. (08 Marks)

Module-4

- 7 a. Write short notes on :
 i) Power System reliability ii) Power System Security. (08 Marks)
 b. Explain with a flow chart, the optimal load flow solution without inequality constraints. (08 Marks)

OR

- 8 a. Discuss the solution procedure of optimal scheduling of Hydro – thermal plants. (08 Marks)
 b. Explain the benefits of maintenance scheduling. (08 Marks)

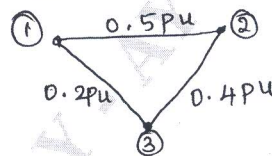
Module-5

- 9 a. Derive Z_{bus} equation when a branch is added to the partial network. (08 Marks)
 b. Explain the steps involved in solving Swing equation using Runge – Kutta method. (08 Marks)

OR

- 10 The series impedances of the line are shown in Fig. Q10. Develop the Z_{bus} by Z_{bus} building algorithm, taking the elements in the order of 0 to 1 , 0 to 2 , 1 to 2. (16 Marks)

Fig. Q10



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