CBCS SCHEME

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15EE71

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

1 a. Define a Primitive network and hence derive an equation for calculating Y_{bus} by Singular Transformation method. **(08 Marks)**

b. For the network shown below in Fig. Q1(b), find Y_{bus} by singular Transformation method. **(08 Marks)**

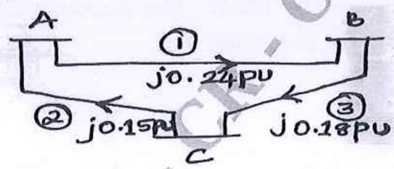

Fig. Q1(b)

OR

2 a. Develop the Gauss – Seidel load flow model for a power system with a slack bus and only PQ buses. **(08 Marks)**

b. 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)**

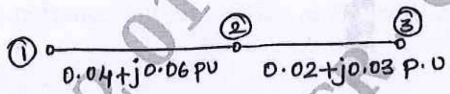

Fig. Q2(b)

Module-2

3 a. Explain Newton Raphson method of Load flow analysis with flow chart. **(08 Marks)**

b. Deduce the FDLF model stating clearly all assumptions. **(08 Marks)**

OR

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

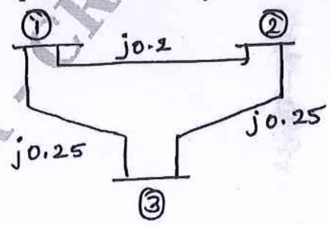

Fig. Q4

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)**

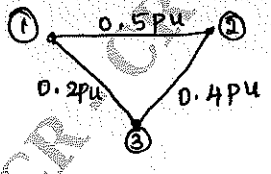

Fig. Q10

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