CBCS SCHEME

USN | | | | | | | | | | |

17EE71

Seventh Semester B.E. Degree Examination, June/July 2024
Power System Analysis – II

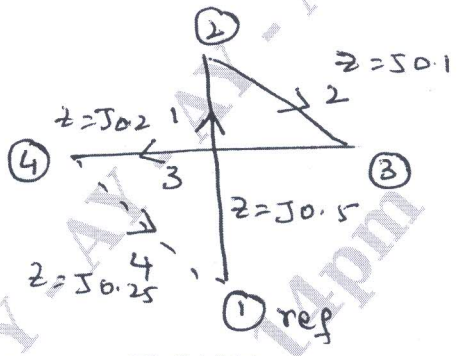
Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. With usual notation, deduce the expression for Y_{BUS} using singular transformation method. **(10 Marks)**

b. Determine the Y_{BUS} using singular transformation method for the power system shown on the Fig.Q1(b).



FigQ1(b) **(10 Marks)**

OR

2 a. Draw the flow chart of Gauss-Seidel load flow analysis. **(10 Marks)**

b. For the sample power system shown in the table the generator are connected to all four buses while loads are at 2, 3 and 4. The values of real and reactive powers are listed. All buses other than the swing BUS are PQ bus. Assume a flat voltage start method. Find the voltage and BUS angle at 3 – buss at the end of the I[st] iteration.

e	BUS	Y
1	1 – 2	2 – 65
2	1 – 3	1 – 35
3	2 – 3	0.66 – 25
4	2 – 4	1 – 35
5	3 – 4	2 – 65

BUS	P	Q	Vin
1	–	–	1.04∠6
2	0.5	–0.2	
3	–1.0	0.5	
4	0.3	–0.1	

(10 Marks)

Module-2

3 a. Write the iterative algorithm for N-R method of load flow analysis. **(08 Marks)**

b. Derive the Jacobin matrix elements and equation from the load flow equations. **(12 Marks)**

OR

4 a. Compare G.S, NR and FDLF analysis. **(08 Marks)**

b. Stating All assumption deduce the FDLF mode. Explain the step by step procedure for load flow solution using FDLF method. **(12 Marks)**

Module-3

5 a. Deduce the condition for optimal load dispatch. Considering transmission losses on a system comprising K – plants. **(08 Marks)**

b. For the system shown obtain expression for B-co-efficient B_{11}, B_{22} and B_{12}. (Refer Fig.Q5(b).

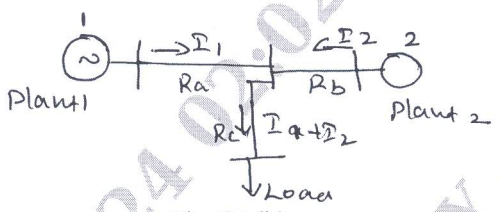


Fig.Q5(b) **(12 Marks)**

OR

6 a. The incremental fuel cost in Rs/MWh for a plant consisting of two units are,

$$\frac{df_1}{dp_1} = 0.25P_1 + 40, \quad \frac{df_2}{dp_2} = 0.3P_2 + 30$$

Assume that all units are operating at all times and total load varies from 40MW to 300MW. The 25MW and 150MW respectively. Determine :

i) The most economical division of load between the generators for a load of 250MW

ii) The saving on Rs/day obtained compared to equal sharing between the two units. **(10 Marks)**

b. With a usual notation, derive the generalized transmission formula and B-co-efficient. **(10 Marks)**

Module-4

7 a. State the mathematical formulation of hydrothermal systems with assumption and constraints. **(10 Marks)**

b. Explain power-system state security level classification. **(10 Marks)**

OR

8 a. Explain briefly the function of system security analysis. **(10 Marks)**

b. Explain briefly maintain scheduling and power system reliability. **(10 Marks)**

Module-5

9 a. Explain the Z_{bw} – building algorithm for a link addition to the partial networks with no mutual coupling. **(10 Marks)**

b. For the networks graph shown, determine t_{bus} with node 1 as reference using building algorithm. Neglect mutual coupling self impendence of elements as marked on the diagram. Add elements in the order specified. (Refer Fig.Q9(b).

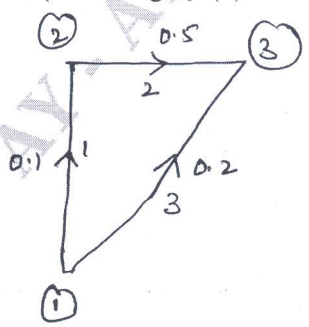


Fig.Q9(b) **(10 Marks)**

OR

10 a. Explain with necessary equation the solution of swing equation by point by point method. **(10 Marks)**

b. Discuss the various steps for determining multi-machine stability of power-system. **(10 Marks)**