Code: 13A02604 **R13**

B.Tech III Year II Semester (R13) Supplementary Examinations December 2016

POWER SYSTEM ANALYSIS

(Electrical & Electronics Engineering)

Time: 3 hours Max. Marks: 70

PART - A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Define the terms tree and basic cutest.

(b) What is bus incidence matrix?

(c) Write load flow equations in polar form.

(d) Write the generator bus data needed for load flow.

(e) Compare G – S and N – R methods in terms of programming ease and convergence characteristics.

(f) Write power mismatch equations in N – R method.

(g) Give the expression for short circuit capacity at a bus.

(h) Name any two types of reactors.

(i) Define power system stability.

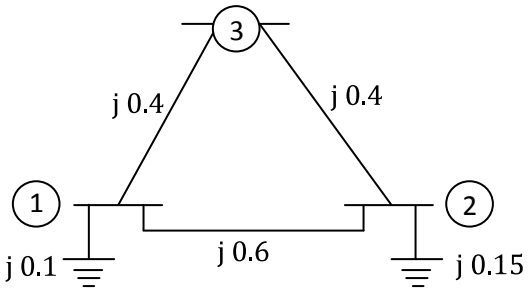
(j) What are the assumptions made while solving the swing equation?

PART - B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT - I

2 Construct the bus impedance matrix for the network shown below. All impedances are shown in p.u.



OR

3 Derive the modification of Z_{bus} for addition of an element between two old buses.

UNIT - II

4 Give the algorithm for load flow solution using Gauss – Seidel method. Draw a flow chart representing the method.

OR

5 (a) Give the load flow solution using Gauss – Seidel method to include P – V buses.

(b) What is acceleration factor? How is it to be implemented?

UNIT - III

6 Derive the expressions for all Jacobian elements of NR method for load flow solution in polar coordinates.

OR

7 Explain decoupled and fast decoupled methods with necessary equations.

Contd. in page 2

UNIT - IV

8 (a) Define positive, negative and zero sequences.

(b) A three phase balanced load with a self impedance of Z_s and mutual impedance Z_m is connected in star. An impedance Z_n is connected between the neutral and the ground. Find the sequence impedance matrix.

OR

9 A 20 MVA, 13.8 kV generator has a direct – axis subtransient reactance of 0.25 p.u. Its negative sequence reactance is 0.35 pu and zero sequence reactance is 0.1 pu. The neutral of the generator is grounded. Find the fault current, line-to-ground voltages and line-to-line voltages.

UNIT - V

10 What is transient stability? How equal – area criterion is useful in the assessment of transient stability of the system?

OR

11 Derive an expression for critical clearing angle.

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