Code No: RT32024 **R13** SET - 1

III B. Tech II Semester Supplementary Examinations, November/December-2016

POWER SYSTEM ANALYSIS

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

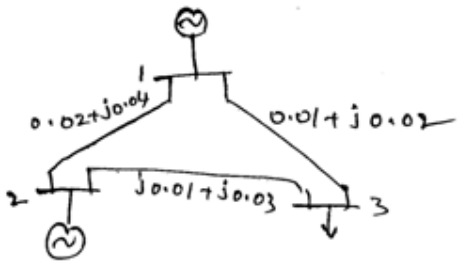
1 a) Define the bus incidence matrix
b) What is the necessity of load flow solution
c) What are the four ways of adding impedance to an existing system so as modify Z_{bus} matrix
d) How do you get the short circuit kVA from p.u impedance
e) When the system is unbalanced
f) What are the essential factors affecting the stability

PART -B

2 a) Discuss how to form Y_{Bus} by direct inspection with a suitable example

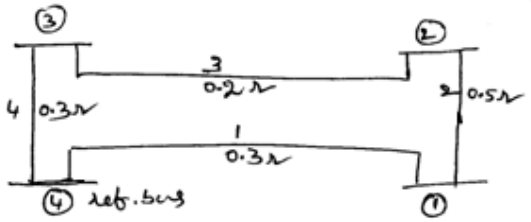
b) A 50kW, three phase, Y connected load is fed by a 210kVA transformer with voltage rating 11kV/415V through a feeder. The length of feeder is 1km and the impedance of the feeder is (0.25+j 4) ohm/km. If the load power factor is 0.8. Determine the p.u impedance of the feeder and load.

3 The power system network shown in below network, obtain V_3 using N-R method after first iteration. The impedance values in p.u indicted in the network.



Bus code	$\|V\|$	Generation MW	Generation MVAR	Load MW	Load MVAR
1	1.05	-	-	-	-
2	1.02	10		7.5	7
3	1.0	0	0	30	15

4 Given the network shown in below figure



Its Z_{Bus} is follows

$$Z_{Bus} = \begin{bmatrix} 0.23 & 0.11 & 0.07 \\ 0.11 & 0.21 & 0.18 \\ 0.07 & 0.18 & 0.23 \end{bmatrix}$$

If the line '2' is removed, determine the Z_{Bus} for the changed network.

5 a) What is the importance to study the short circuit analysis? Discuss the possible causes of short circuits in the power system

b) Determine short circuit MVA at the bus bars of a generating station 500 MVA and other station is 200 MVA. The generated voltage of each station is 12 kV. Also find the possible short circuit MVA at each station when they are linked by an inter connected cable with a reactance of 0.6 Ω

6 a) What is a 3-Phase unsymmetrical fault? Discuss the different types of unsymmetrical faults that occur in a 3-Phase system

b) A 30 MVA, 3-ϕ alternator, having its neutral solidly grounded is operating at no load, its voltage being 13.2 kV between lines. It has a reactance to positive sequence currents of 3Ω, the reactance's to negative and zero sequences currents are 90% and 40% of the positive sequence value respectively. For a double line to ground fault, determine i) the currents in the faulty lines, ii) the current through ground and iii) the voltage of healthy phase to neutral.

7 a) Explain the latest methods to improve the transient state stability

b) A generator with constant excitation supplies 35MW through a step up transformer and a high voltage line to an infinite bus bar. If the steady state stability limit of the system is 60MW, determine the maximum permissible sudden increase of generator output (resulting from sudden increase prime mover output) if the stability is to be maintained. Assuming resistance of generator, lines and transformers are neglected.

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