Total No. of Printed Pages:3

SUBJECT CODE NO:- 451
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(EEP/EE/EEE) Examination Nov/Dec 2015
Power Systems Analysis
(Revised)

[Time: Three Hours] **[Max. Marks: 80]**

"Please check whether you have got the right question paper."

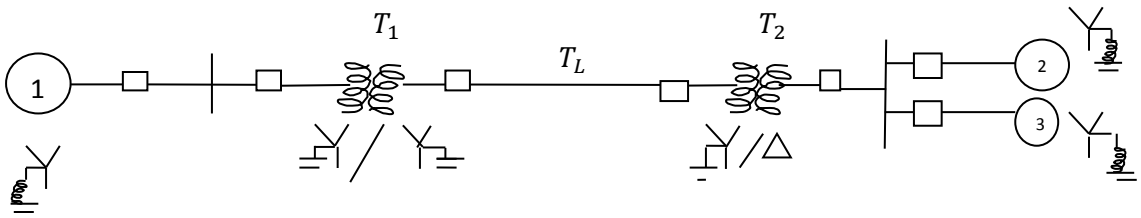
N.B i) Q.No.1 A and Q.No.6 are compulsory.
ii) Attempt any two questions from the remaining questions in each section.
iv) Assume suitable data, if necessary.

Section A

Q.1 Solve any five questions of the following. 10

i) What are components of power system and function of transformer?
ii) What is need of base values?
iii) If the reactance in ohms is 15 ohms find the P.U value of base of 15 KVA and 10 KV.
iv) What is bus impedance matrix?
v) What are symmetrical components?
vi) What is load flow study?
vii) Define voltage controlled bus?
viii) Write the load flow equations of Neutron Raphson method.

Q.2 a) Obtain the per unit impedance (reactance) Diagram of the power system shown in fig1. 08



07

Gen No.1: 30MVA , 10.5KV,$X^{"} = 1.6\Omega$
Gen No.2: 15MVA , 6.6KV ,$X^{"} = 1.2\Omega$
Gen No.3: 25MVA , 6.6KV ,$X^{"} = 0.56\Omega$

$T_1(3\ phase);\ 15\ MVA, 33/11KV, x = 15.2\Omega/ph$
$T_2(3\ phase);\ 15\ MVA, 33/6.2KV, x = 15.2\Omega/ph$

TL (line) : $20.5\Omega/ph$
Choose a base of 30MVA, 11KV in gen No.1

b) Derive the expression for per unit & impedance referred to new base value.

Q.3 a) Prove the bus admittance matrix from singular transformation of the primitive Y matrix. 08

b) For the power system as shown in fig.2 obtain $\hat{A}, \hat{B}, \hat{C}\ \&\ K$ 07

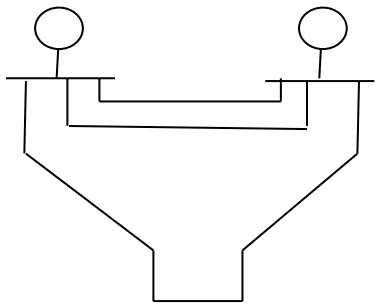


Fig2.

Q.4 a) Explain Gauss siedal algorithm for load flow solution. 08

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b) Fr the power system shown below compute Y_{BUS} and bus voltage upto one iteration using Gauss-seidel method for 07

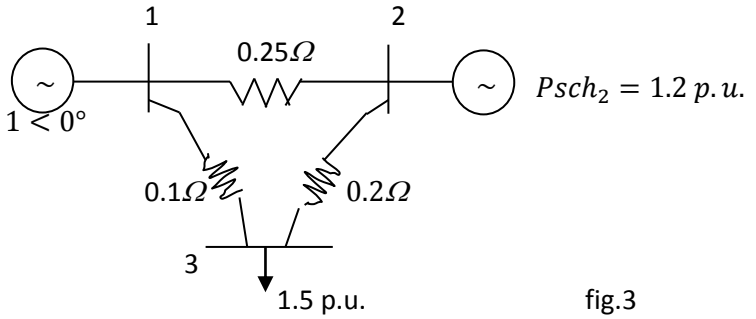


fig.3

Q.5 a) Derive an expression for symmetrical components of $V_S = A^{-1}Vp$. 08

b) Derive the expression for transients on transmission line. 07

Section B

Q.6 Solve any five questions of the following. 10

i) What are sequence impedance and sequence networks?

ii) What do you mean complex power injected to a bus. Write expression also.

iii) What is bus? And what is infinite bus?

iv) Mention the various methods of voltage control employed in power system.

v) Define maximum momentary current.

vi) How the faults are classified?

vii) Name the main difference in representation of power system for load flow & short circuit studies.

viii) What is meant by doubling networks?

Q.7 a) Explain the sequence networks of transformers for. 08

I) $Y - \Delta$

II) $\Delta - \Delta$

b) Three 6.6KV generators A,B &C each of 10% leakage reactance & MVA rating 40, 50.& 25 are connected as shown in fig4. by a tie bar through current limiting reactor, each of 12% & reactance based upon the rating of the machine to which it is connected. A3Ø feeder is supplied from the busbar of generator A at line voltage of 6.6 K.V. he feeder has a resistance of $0.06\Omega/ph$. And inductive reactance of $0.12\frac{\Omega}{ph}$. estimate the maximum MVA that can be fed into a symmetrical SC at the far end of the feeder. 07

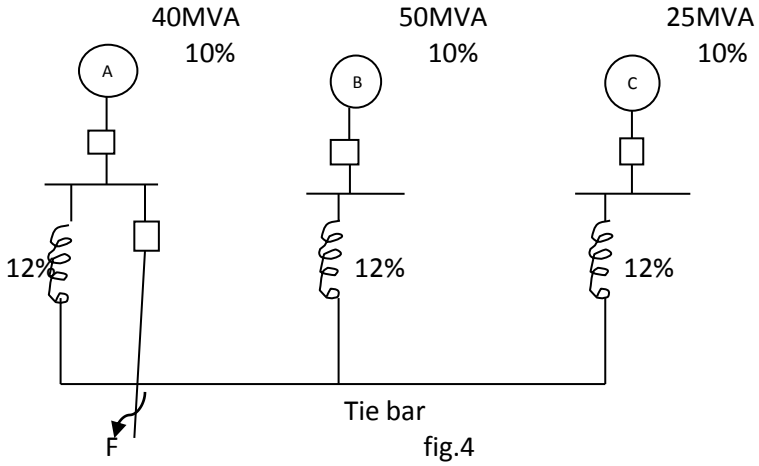
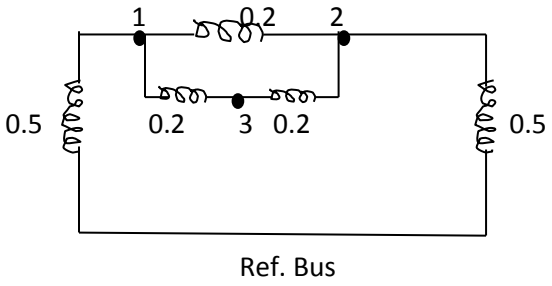


fig.4

Q.8 a) Explain the ZBUS formation and ZBUS steps for Building Algorithm. 8

b) Fig5 shows a three bus network .Obtain impedance matrix Bus. 7



Q.9 a) Derive the expression to determine fault current for L-L-G fault .Draw the sequence network. 08

b) A 25 MVA, 11KV generator has positive sequence reactance 0.3pu .It negative sequence and zero sequence reactance 0.4 and 0.15 Pu respectively. The neutral of generator is soidly grounded. Determine the fault current when L-L-G fault occurs at the generator terminals. 07

Q.10 a) Explain briefly the static scarcity analysis at control centers. 08

b) Explain the open conductor faults 07

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