(Updated 5 Jan 2016)

Regarding the topics to be tested for the Quiz, May I know if it covers up to Tutorial 5 or 6?
Does it involve the topics on Transmission Lines?
The Quiz covers T1 – T6. You can log on to NTUlearn. The Edventure/NTUlearn Announcement message (I reproduce below) has all the info.

Mon, Aug 22, 2005 -- EE3015-C-LEC-05S1: *Quiz in Week 8, 19 – 23 September, 2005*

Dear E315/EE3015 Students

The quiz will be held on 19-23 Sep 2005 and it will be conducted by the respective tutor at the respective tutorial time and in the respective tutorial room.

The format of the quiz is MCQ.

The materials tested in the quiz include the lectures from Week 1 (Per-Unit) to Week 6 (Fault Analysis). The lecture on protection will not be included in the quiz but will be included in the final exam. Tutorial #6 (Fault Calculation) discussed next week is in your quiz. Please take a look at the sample quiz in our EE3015 Edventure/NTUlearn.

Thank you.

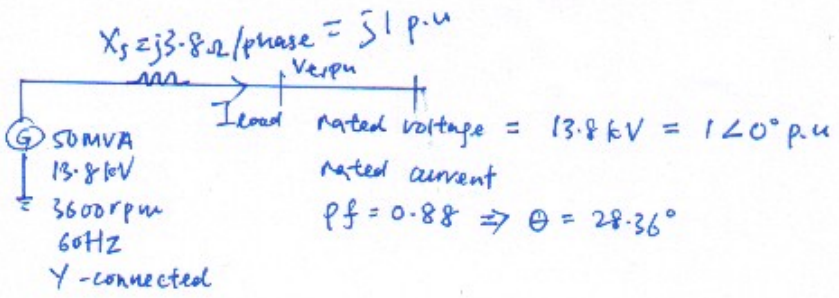
H B Gooi

EE3015 Lecturer

Other info in the Edventure/NTUlearn such as Q/A files may be useful to your quiz preparation.

I have some problems on the question 2 and question 6 from the posted quiz in Edventure for EE3015. May I know my mistakes since I can not get the answers? Details are as follows:

Q2:



Find E_g.

$S_b = 50\text{MVA}$

$V_b = 13.8\text{ kV}$

$$I_b = \frac{S \times 1000}{\sqrt{3}\,V_b} = \frac{50 \times 1000}{\sqrt{3} \times 13.8} = 2.09\text{ kA}$$

$$I_{load,pu} = \frac{2.09\text{k}}{2.09\text{k}} \angle -28.36° = 1\angle -28.36°\text{ p.u.}$$

$$Z_b = \frac{V_b^2}{S_b} = \frac{13.8^2}{50} = 3.8$$

$$X_{s,pu} = \frac{j3.8}{3.8} = j1\text{ p.u.}$$

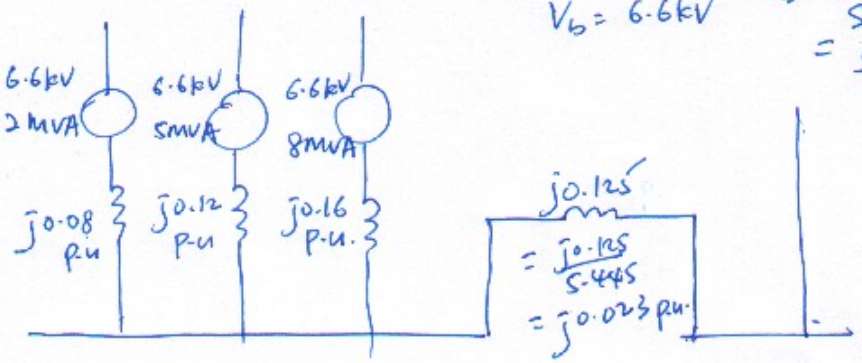
$$E_{g,pu} = I_{load,pu} X_{pu} + V_{t,pu}$$
$$= (1\angle -28.36°)(1\angle 90°) + 1\angle 0°$$
$$= 1\angle 61.64° + 1$$
$$= 0.475 + j0.879 + 1$$
$$= 1.475 + j0.879$$
$$= 1.717\angle 30.79°\text{ p.u}$$

$$|E_g| = 1.717 \times V_b$$
$$= 1.717 \times 13.8 = 23.69\text{ kV}$$

Q2: I looked at solution steps. You seem to get the correct value for the line-to-line voltage. You forgot the last step of converting it to the phase voltage by dividing it by SQRT(3).

Q6.

$S_b = 8\,MVA$ $V_b = 6.6kV$ $Z_b = \frac{V_b^2}{S_b} = \frac{6.6^2}{8} = 5.445\,\Omega$



Find the fault MVA.

$\frac{(j0.08)(j0.12)}{j0.08 + j0.12} = j0.048$

$\frac{j0.048\,(j0.16)}{j0.048 + j0.16} = j0.0369$ p.u

$\therefore$ $j0.08 \,//\, j0.12 \,//\, j0.16 = j0.0369$ p.u.

$Z_{T,pu} = j0.023$ p.u. $+ j0.0369$ p.u.

$= j0.0599$

$I = \frac{V}{Z} = \frac{1\angle 0^\circ}{j0.0599} = 16.67\angle -90^\circ$ p.u.

$S = VI^* = (1)(16.67\angle 90^\circ) = 16.67\angle 90^\circ$ p.u.

the fault MVA

$|S| = 16.67 \times 8\,MVA = 133.36\,MVA$

Q6: You forgot to transform the reactances of 0.08 and 0.12 pu into ones based on 8 MVA base. The remaining steps look okay to me.

Sample Quiz Q5: How do you find the pf of the other generator given the first one?
This is very similar to Tutorial 4.2b. You could use the following formula to compute the power factor.

Sload = S1 + S2

Since Sload is given, i.e. 6/0.8 at Cos^{-1} 0.8 and S2 = P2/0.71 at Cos^{-1} 0.71. You get your P2 from the load-frequency calculation. Hence S1 can be obtained.

Once you get S1, take Cosine of the S1 angle to obtain the pf. If the angle of S1 is positive, it means the pf is lagging. If it is negative, then the pf is leading.

Sample Quiz Q6: I really have no idea how to approach this question.
I would draw those 3 alternators in parallel (since the question state that they are connected to a common busbar), with their respective per unit reactance in series with each of the E voltage sources. I would connect each end of the E voltage source to ground. The other end of each reactance is shorted to the common busbar (in parallel) and the busbar is then in series with the feeder cable.

I would choose the base voltage = 6.6KV and base MVA=8MVA. I would then convert all the per-unit reactance values of the alternators using the new bases. Since the fault occurs at the end of the feeder, I would need to convert the 0.125 ohm feeder reactance to per-unit using the calculated Zbase. Next, the equivalent reactance of all the three reactance values in parallel is found using the parallel impedance formula. I then add the equivalent parallel impedance value of the combined three alternators to the feeder reactance. The final value is what we call the Thevenin equivalent impedance or the driving-point impedance looking into the faulty port, i.e. the terminals at the load end of the feeder and the ground. Next compute the fault current by dividing the 1 pu pre-fault voltage by the driving-point impedance.

Fault MVA is obtained by taking per-unit fault current times Sbase. We assume that the pre-fault voltage is one and hence there is no need for you to multiply the per-unit fault current by one if we do not want to.

Are we allowed to take this week quiz in other tutorial classes?
In general, we would prefer students taking their quiz in the group that they registered. Otherwise there would be many transfers of quiz papers to the rightful owners. Internally, to minimize the confusion, only the original tutors are allowed to grade the quiz paper and enter the marks. I hope that you understand that this is to facilitate the mark entry process.

However, if you have difficulties, we would allow you to take the quiz in other groups.

How can I help to reduce the confusion if I am taking the quiz in another group?
You should inform both the tutors concerned so that the tutor who administers the quiz knows to whom he should deliver your unmarked quiz paper to.

The tutor names for all the tutorial groups are available from our EEE timetable web.

Are we able to have the quiz questions back so that we know our mistakes and also can try on other questions?
Following the school practice, we would not return the marked quiz paper back to the students. However, you would be able to know the mistakes that you made and try on other sets of quiz papers as we will post both the question sets and answers onto E315/EE3015 Edventure/NTUlearn.

I hear from my friends that if we did not go to our original tutorial class to take the test, we will not be given the 3 bonus points? Is that true? And will I be affected?
Do not listen to rumors. You will get your 3 bonus marks (2 bonus marks since the maximum quiz marks have been reduced from 15 to 10) if you do your quiz in any tutorial group this week.