Dynamics - Practice

Click on a question number to see how your answers were marked and, where available, full solutions.
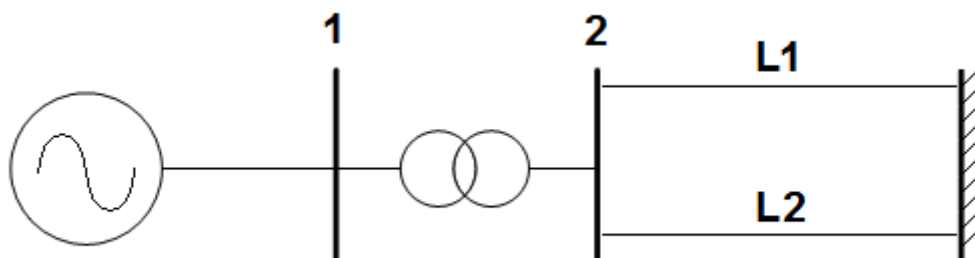
Question Number	Score		
Question 1	13	/	20
Total	13	/	20 (65%)

Performance Summary

Exam Name:	Dynamics - Practice
Session ID:	02006175886
Exam Start:	Tue Jan 04 2022 04:48:20
Exam Stop:	Tue Jan 04 2022 05:33:23
Time Spent:	0:45:02

Question 1

In the system shown in **Figure 1**, a generator is connected to the infinite bus through two lines. The system information is shown in **Table 1**.

Figure 1: A generator connected to the infinite bus

Generator reactance	X_G	0.15	p.u.
Transformer reactance	X_T	0.15	p.u.
Reactance of each line	X_L	0.15	p.u.
Generated voltage	E	1.07	p.u.

Table 1: System information

The generator is protected with an overcurrent relay with an inverse-time relationship given by:

$$t = \frac{K}{\left(\frac{I}{I_0}\right)^p - 1}$$

The relay parameters are shown in **Table 2**.

K	3.25
p	1
I_P	0.63

Table 2: Relay parameters

Maximum Load Current I_L

If the load angle at maximum load is $\delta = 14^o$ calculate the maximum load current.

$I_L =$ [0.691] ✔

Expected answer: `0.6977660647` $p.u.$

✔   Your answer is correct. You were awarded **5** marks.

You scored **5** marks for this part.

Score: 5/5 ✔

Critical Current I_{CC}

A fault occurs halfway along line L2, with a critical clearing angle of $\delta_{CC} = 57^o$. Calculate the current flow at this critical point.

$I_{CC} =$ | 2.564 | ✖

Expected answer: 2.6611366803
$p.u.$

✖   Your answer is incorrect.

You scored **0** marks for this part.

Score: 0/7 ✖

Relay Suitability

The critical clearing time for this fault is $t_{CC} = 0.84s$. Sketch the time-inverse curve and determine whether the relay's protection settings are adequate.

○   Yes, this relay is suitable

◉   No, the relay trips for normal current flow

○   No, the system goes unstable before the relay trips

✔

Expected answer:
○   Yes, this relay is suitable

◉   No, the relay trips for normal current flow

○   No, the system goes unstable before the relay trips

✔   You chose a correct answer. You were awarded **8** marks.

You scored **8** marks for this part.

Score: 8/8 ✔

Created using Numbas (https://www.numbas.org.uk), developed by Newcastle University (http://www.newcastle.ac.uk).