Dynamics - Practice

Click on a question number to see how your answers were marked and, where available, full solutions.

Question Number	Score
Question 1	20 / 20
Total	**20 / 20 (100%)**

Performance Summary

Exam Name:	Dynamics - Practice
Session ID:	01567142943
Exam Start:	Tue Jan 04 2022 05:38:39
Exam Stop:	Tue Jan 04 2022 05:44:27
Time Spent:	0:05:48

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**.

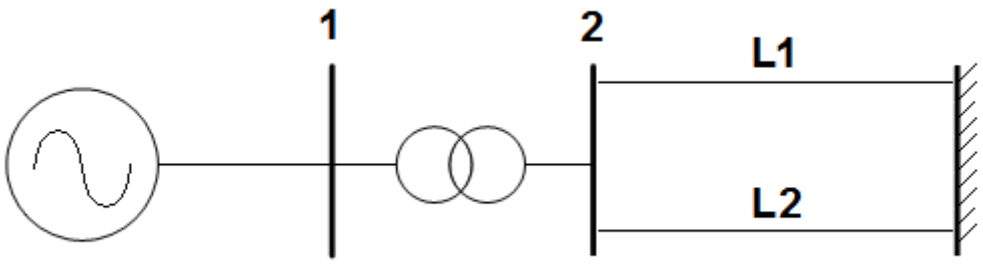

Figure 1: A generator connected to the infinite bus

Generator reactance	X_G	0.1	**p.u.**
Transformer reactance	X_T	0.25	**p.u.**
Reactance of each line	X_L	0.2	**p.u.**
Generated voltage	E	1.04	**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	3.58
p	1
I_P	0.35

Table 2: Relay parameters

Maximum Load Current I_L

If the load angle at maximum load is $\delta = 11^o$ calculate the maximum load current.

I_L = 0.441 ✔ Expected answer: 0.4434180283 $p.u.$

✔ 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 $\delta_{CC} = 65^o$. Calculate the current flow at this critical point.

I_{CC} = 2.26214 ✔ Expected answer: 2.2764550753 $p.u.$

✔ Your answer is correct. You were awarded **7** marks.

You scored **7** marks for this part.

Score: 7/7 ✔

Relay Suitability

The critical clearing time for this fault is $t_{CC} = 0.93s$. 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 ✔