# Dynamics - Practice

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

| Question Number | Score |
|---|---|
| Question 1 | 8 / 20 |
| **Total** | **8 / 20 (40%)** |

# Performance Summary

| | |
|---|---|
| **Exam Name:** | Dynamics - Practice |
| **Session ID:** | 12220225747 |
| **Exam Start:** | Mon Jan 03 2022 11:37:47 |
| **Exam Stop:** | Mon Jan 03 2022 13:09:10 |
| **Time Spent:** | 1:31:22 |

# 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**.

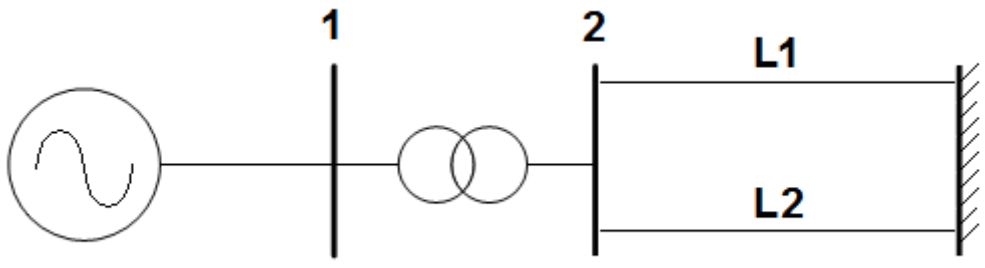


*Figure 1: A generator connected to the infinite bus*

| | | | |
|---|---|---|---|
| Generator reactance | $X_G$ | 0.2 | **p.u.** |
| Transformer reactance | $X_T$ | 0.2 | **p.u.** |
| Reactance of each line | $X_L$ | 0.15 | **p.u.** |
| Generated voltage | $E$ | 1.05 | **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**.

| | |
|---|---|
| $K$ | 3.01 |
| $p$ | 2 |
| $I_P$ | 0.98 |

*Table 2: Relay parameters*

## Maximum Load Current $I_L$

If the load angle at maximum load is $\delta = 29^o$ calculate the maximum load current.

$I_L$ = 2.21 ✖ Expected answer: 1.0853823305 $p.u.$

✖ Your answer is incorrect.

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

**Score: 0/5** ✖

## Critical Current $I_{CC}$

A fault occurs halfway along line L2, with a critical clearing angle of $\delta_{CC} = 79^o$ . Calculate the current flow at this critical point.

$I_{CC}$ = 0.65 ✖ Expected answer: 2.3094489903 $p.u.$

✖ Your answer is incorrect.

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

**Score: 0/7** ✖

## Relay Suitability

The critical clearing time for this fault is $t_{CC} = 0.55s$. 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** ✔