Q1: Describe common types of distributed energy sources, based on renewable and non-renewable energy resources? (5 %)

Q2: Explain five advantages, which DG technologies can bring for power and energy society? (5 %)

Q3: Explain the application of DG technologies in a Steel factory? (5 %)

Q4: Figure 1 shows the inner control loops of the current i_{cd} in a grid-connected converter? Calculate the values of k_p and k_i for the best transient response during the synchronization of converter with power grid. (10 %)
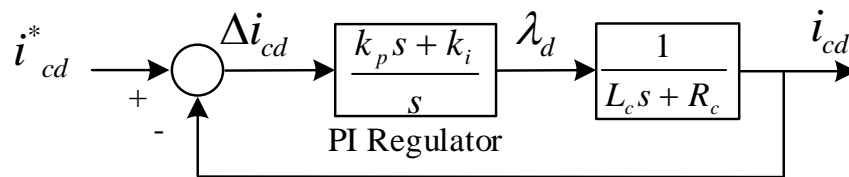

Fig. 1. Equivalent diagram of d-axis current control loop.

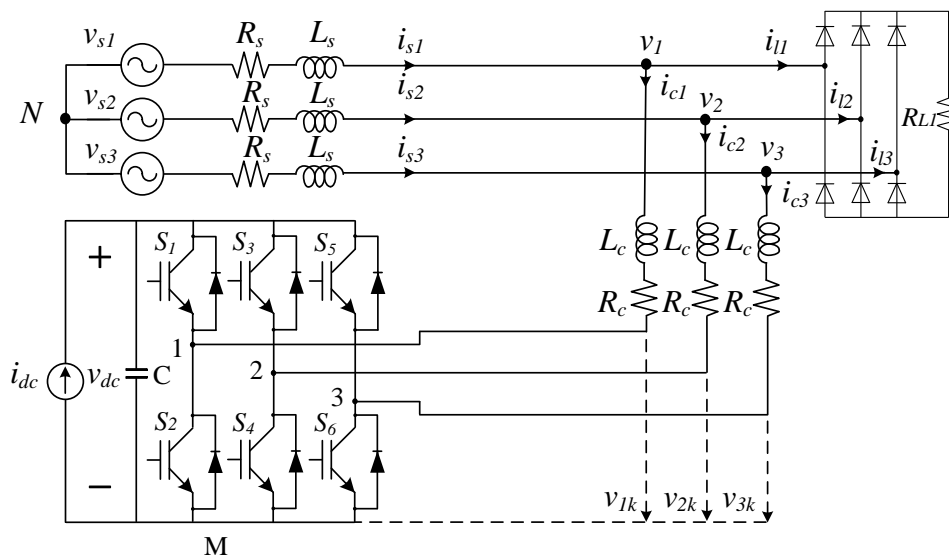**Q5:** Figure 2 shows the general model of a grid-connected converter. Find the general dynamic equation of the proposed model. (25 %)

Figure 2: General model of a grid-connected converter.