

I.

Small questions. Short answers, please.

- (a) What is meant with the term *sympathetic vibration* in acoustics? What role does it have in musical instrument acoustics?
- (b) What is acoustic reflex (=stapedius reflex) in human hearing?
- (c) What are shelving filters? What difference do they have compared to usual low/high/bandpass filters?

II. (6 p.)

Tell about the *masking phenomenon* in human hearing? What does it mean? When does it occur? Where can it be utilized? What is meant with *masking threshold*? What are *critical bands* and how are they related to the masking phenomenon?

III. (6 p.)

Tell about the *Karplus-Strong* sound synthesis algorithm. How does the algorithm work and what control parameters does it provide? What kind of spectra does it produce? What types of instrumental sounds can it best produce?

IV. (6 p.)

What is meant with *dynamic range control*? Where is it needed? Draw a block diagram which shows the basic blocks of a dynamic range control system and describe the function of each part.

V.

- (a) What is meant with *dither-method* in AD/DA conversion? Where and why does it help? (2 p.)
- (b) Why is non-uniform quantization sometimes useful? (1 p.)
- (c) How can the spectrum of the quantization noise be shaped (during the quantization process)? (3 p.)