Név: _____

Neptun kód: _____

1. 10 point Describe the role and characteristics of Gamma-correction (Opto-electronic Transfer Function, OETF) and illustrate the process with a block diagram! The explanation should include the aspects, concerning the choice of bit/sample (quantization bit depth) and perceptual quantization!

2. 15 point What is chroma-subsampling, why was it introduced and what does the chroma subsampling scheme notation indicates? What common chroma subsampling schemes are used in practice?

3. 10 point Calculate the optimal viewing distance for a HDTV display with the aspect ratio of 16:9 and the diameter being 60 inches (153 cm) in case of watching a full HD content with 1080 active lines!

4. 10 point Calculate the active bitrate of a 4k UHDTV video stream (number of active pixels: 3840x2160 at frame rate of 60 Hz, with progressive scanning) if the chroma components are subsampled with a sampling scheme 4:2:0 and components are represented in 10 bits/sample!

5. 10 point What is the general goal of transform coding? What is the optimal transform and name several sub-optimal, fixed base transforms.

6. 20 point Draw the block diagram of an MPEG encoder! Explain the steps of the encoding process if the applied GOP structure is IBBP!

7. 10 point Audio encoding

   - Why do we apply psychoacoustic encoding (mp3, dolby digital, etc.) at all?
   - What kind of error do we introduce to the uncompressed audio by applying a psychoacoustic encoding?
   - Why (or when) isn't it a problem that we introduced this error to our audio signal?

8. 3 point What are the basic axioms of image processing?

9. 7 point List the types of edge detection algorithms and explain their mathematical background!

10. 5 point List the steps of SIFT detector!