

**NOTICE: this exam was delivered to us as an image. We have made a text version for your convenience. It is however unknown from which year the exam is (probably 2017-2018).**

**Good luck learning for your exam!**

**The TBC**

The exam consists of 6 question. Please answer the questions in a compact and to-the-point manner and avoid superfluous information. The first 5 questions will each contribute 15% weight to the final grade, questions 6 will contribute 25%. When necessary, make drawings or diagrams.

**Question 1** (Module A): *Tone attributes*

Please name and give a 1-phrase description of:

- a. three different basic perceptual attributes of a musical tone (pitched sound event).
- b. four perceived musical features that arise from *relations* between pitched sound events.
- c. one application context in MIR in which one of the attributes described under a) and b) play a significant role.

**Question 2** (Module B): *Symbolic music processing*

You have been presented in course lectures and student presentations with the processing of information from symbolic music encodings for the following musical dimensions: 1) rhythm and meter, 2) melody and 3) harmony.

- a. Name for each of the three musical dimensions one computational task/purpose that it is used for (except segmentation which is covered in question 3) and give a 1-phrase description of the task/purpose.
- b. Choose one of the three tasks/purposes and describe how the task is performed. What are the steps involved? How is the task evaluated? Typically, around 5 steps are expected.

**Question 3** (Module B): *Segmentation*

- a. Name and shortly describe three different context in which automatic music segmentation play an important role.
- b. In the course you have learned about different approaches to segmentation (e.g. Gestalt-based models, repetition-based models, expectation-based models) for predicting segment boundaries. Give a short and concise description for one segmentation model, explaining what information is used to predict segment boundaries. What are the steps involved in determining boundaries?

**Question 4** (Module B): *Chord label transcription from audio features*

If you would have to design a transcription system for chord labels from audio – what is the technical task you would have to solve for this? Describe one accepted method for solving this problem. What are the main steps involved that lead from the audio signal to the chord label? What sort of typical errors might you expect?

**Question 5** (Module A, B): *Modelling Emotions in Music*

- a. The BRECVEMA framework by Juslin & Västfjäll for music emotion distinguishes 8 different principles on how music induces emotion, namely Brain stem reflex, Rhythmic entrainment, Evaluative conditioning, Emotional Contagion, Visual Imagery, Episodic memory, Musical expectancy and Aesthetic judgement. Give a short description for three of these principles.
- b. For the 3 principles you have described under a), which type of information extracted from digital music (high-level symbolic, low-level audio or contextual information) might be most appropriate to model the principle? Provide explanations.
- c. In audio feature extraction for emotions, the two-dimensional model of Valence-Arousal is often being used. Shortly explain valence and arousal.
- d. The paper by (Eerola, 2011) has evaluated 39 audio feature regarding their usefulness to predict valence and arousal across musical genre. How successful are valence and arousal for predicting musical genre according to this study?
- e. Name two application scenarios from MIR for automatic music emotion recognition.

**Question 6** (Modules A, B, C): *Sound and music in games*

- a. Name and briefly describe 4 different functions and usages of sound and music for games. (4 sentences).
- b. Name three specific challenges for creating sound and music for games and describe briefly in what way they are linked to different functions and usages of sound and music and game. (2 sentences for each challenge).
- c. Please choose one challenge that you would be interested in working on – think e.g. about a concrete game situation. What features that you have learned about in Module B would you consider to model/adapt to solve the challenge? How would you evaluate your approach? (indicative length: 10-15 sentences)